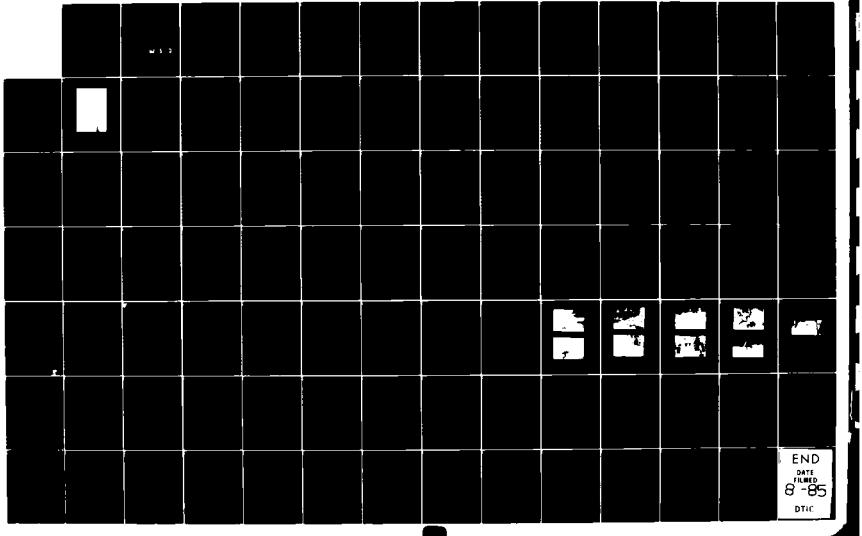
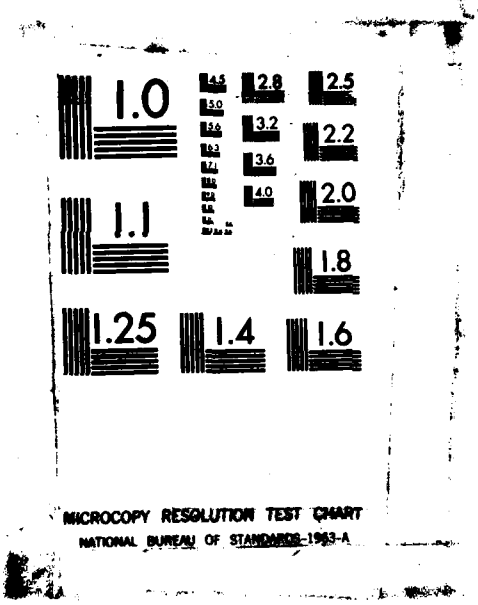
AD-A155 495 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS NEW 1/1
POND DAM (MA 0077..(U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV JUL 81

UNCLASSIFIED F/G 13/13 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

MASSACHUSETTS COASTAL BASIN
EASTON, MASSACHUSETTS

NEW POND DAM

MA 00779

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

JULY 1981

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER MA 00779	2. GOVT ACCESSION NO. AD-A155495	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) New Pond Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE July 1981 13. NUMBER OF PAGES 65
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Massachusetts Coastal Basin
Easton, Massachusetts
Poquanticut Brook

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is about 1100 ft. long with a maximum height of about 14 ft. It is considered to be in fair condition. It is small in size with a significant hazard potential. Technical inspections should be performed every year by a qualified, registered engineer.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED

AUG 18 1981

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

Inclosed is a copy of the New Pond Dam (MA-00779) Phase I Inspection Report, prepared under the National Program for Inspection of Non-Federal Dams. This report is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. I approve the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is vitally important.

Copies of this report have been forwarded to the Department of Environmental Quality Engineering, and to the owner, Trustees of Charles L. Fuller Trust, Brockton, MA. Copies will be available to the public in thirty days.

I wish to thank you and the Department of Environmental Quality Engineering for your cooperation in this program.

Sincerely,

Incl
As stated

WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Acting Commander and Division Engineer

NEW POND DAM

MA 00779

MASSACHUSETTS COASTAL BASIN

EASTON, MASSACHUSETTS

PHASE 1 INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE 1 INSPECTION REPORT

IDENTIFICATION NO.:		MA 00779
NAME OF DAM	:	NEW POND DAM
TOWN	:	EASTON
COUNTY AND STATE	:	PLYMOUTH, MASSACHUSETTS
STREAM	:	POQUANTICUT BROOK
DATE OF INSPECTION:		DECEMBER 11 & 22, 1980

BRIEF ASSESSMENT

The New Pond Dam is an earthen embankment with a vertical cut stone masonry wall forming the downstream face along most of the dam and a near vertical field stone wall along the upstream face. The embankment has a minimum top width of approximately 17 feet and a maximum height of about 14 feet. The overall length of the dam is approximately 1100 feet including two spillways: a main spillway located near the center of the dam, and an emergency spillway located near the right end of the dam. The main spillway is an 8 ft. wide concrete faced stone spillway controlled with stoplogs. The emergency spillway, which is partially filled in due to adjacent roadway construction, is approximately 9 ft. wide. It has stone sidewalls and a natural floor.

The dam impounds New Pond, which is used for limited

recreational purposes. Water from this pond is also used in the irrigation of cranberry bogs downstream. Maximum storage capacity of the dam is about 150 acre-feet.

Based on visual inspection and a review of all available pertinent data, the dam is considered to be in fair condition. Features that could effect the structural integrity of the dam are apparent seepage at the downstream toe of the dam, erosion and slumping of dam slopes, extensive tree growth on the dam crest, and deterioration of concrete facing at the main spillway.

Based on the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the dam is classified as "Small" in size, with a "Significant" hazard potential. A Test Flood which approximated one-quarter of the Probable Maximum Flood (1/4 PMF) was selected in accordance with the Corps of Engineers' Guidelines. The calculated test flood inflow of about 950 cfs resulted in a routed outflow of about 900 cfs. The test flood would overtop this dam by about 0.4 ft. The main spillway would carry about 20% of the test flood, the emergency spillway capacity was considered to be negligible since it is partially filled.

Recommendations include that the owner engage the services of a qualified registered engineer to specify and oversee the removal of trees and root systems on the dam crest, reset all loose and missing blocks in the dam stone walls, investigate the cause of these missing blocks, repair areas of erosion and slumping along the crest and repair the concrete facing along the

main spillway. A detailed hydrologic-hydraulic analysis to assess further the need for and means to increase the project discharge capacity and the ability of the dam to withstand overtopping should be performed. Included in this study should be an assessment of the effects of the recosnstruction of the Route 106 & 123 roadway at the emergency spillway.

Technical inspections by a qualified, registered engineer should be performed every year. A formal downstream warning system should be put into effect. A formal maintenance program should be instituted.

The owner should implement the recommendations and remedial measures as described herein and in greater detail in Section 7 of this Report within 1 year after receipt of this Phase 1 Inspection Report.

ASEC CORPORATION

John F. Modzelewski P.E.
Project Engineer/
Director of Engineering Services

This Phase I Inspection Report on New Pond Dam (MA-00779) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH W. FINEGAN, JR., CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase 1 Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase 1 Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general co. 'tion of the dam is based upon available data and visual inspection. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase 1 investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect

to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

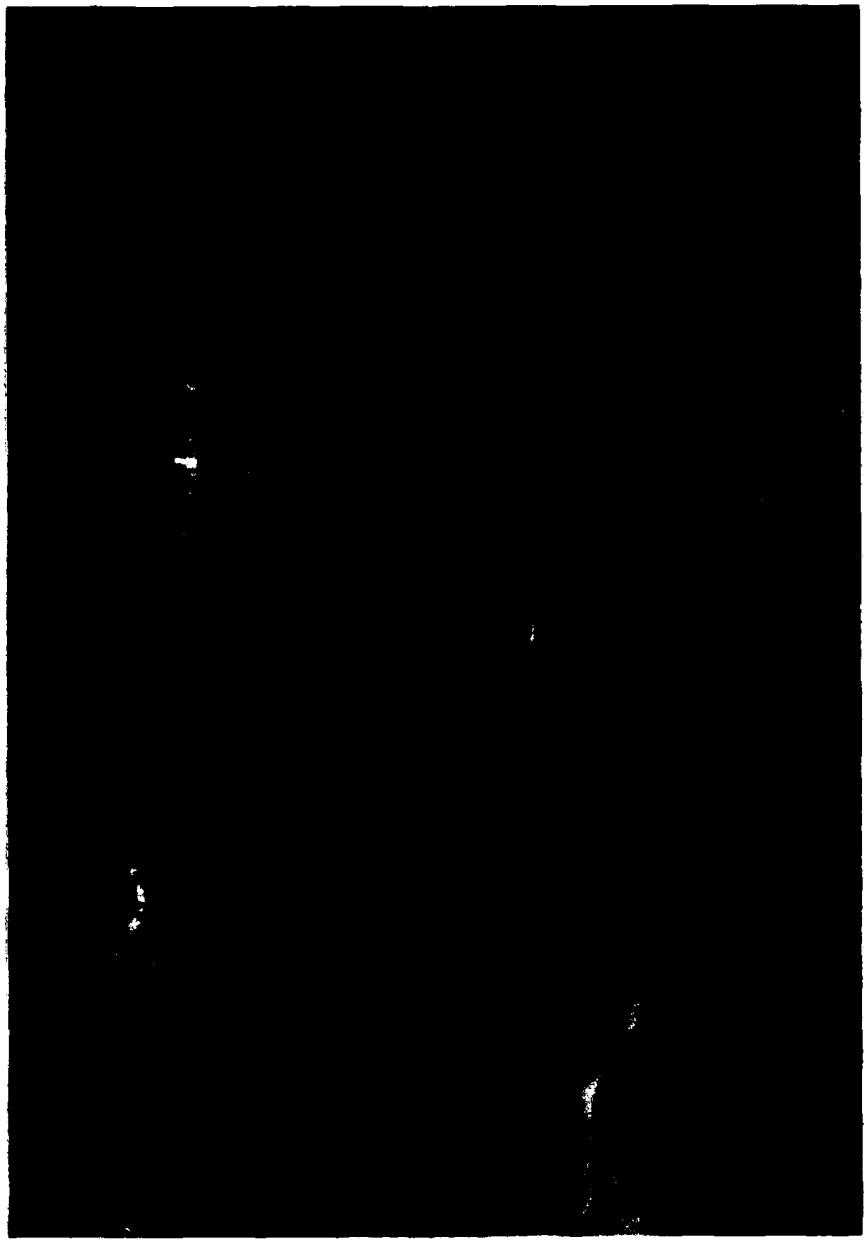
Phase 1 inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstre damage potential.

The Phase 1 Investigation does <u>not</u> include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

TABLE OF CONTENTS

INDEX TO REPORT

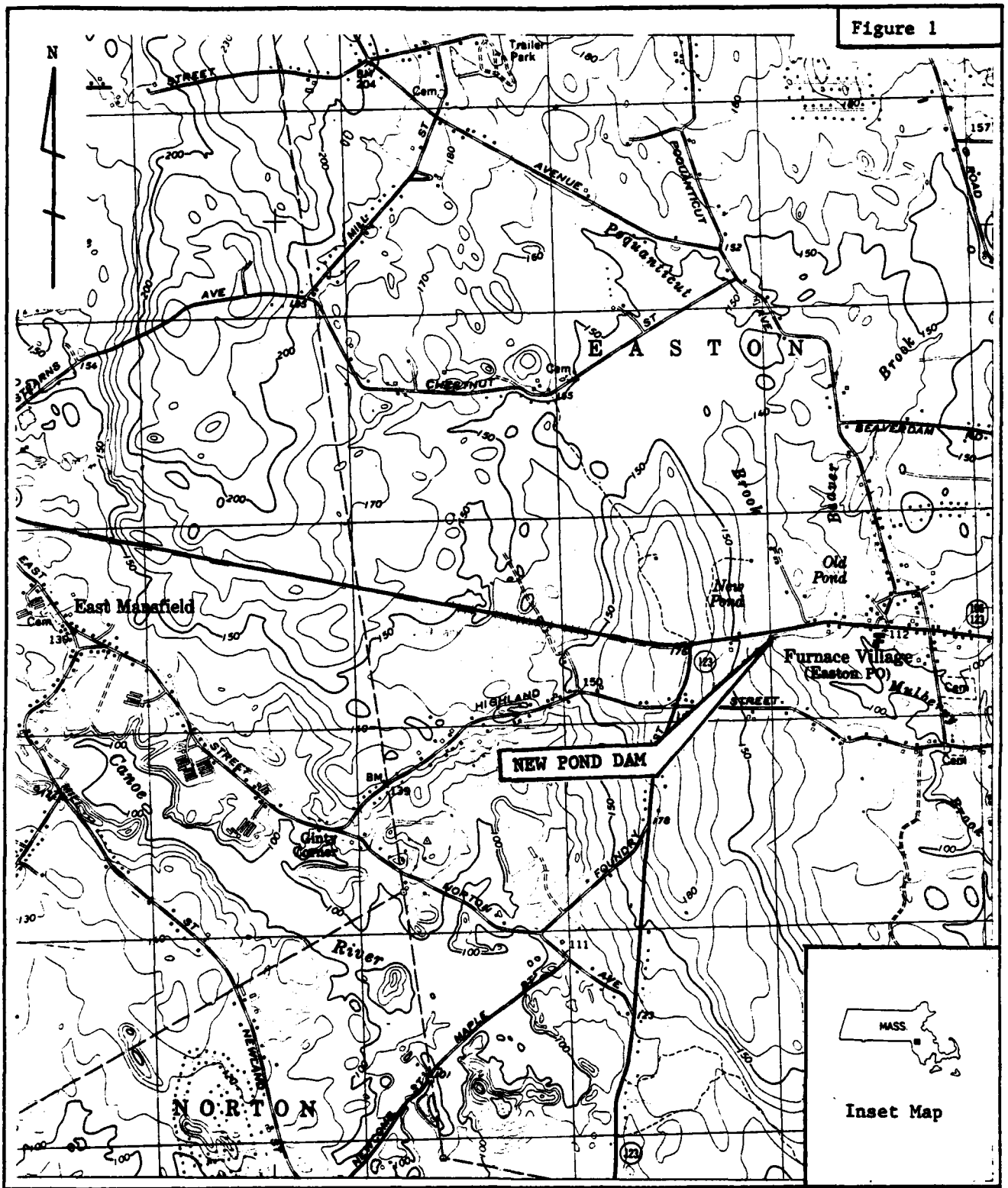
APPENDIXES



Overview Photo

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS ASEC CORP. CONSULTING ENGINEERS BOSTON, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	NEW POND DAM TR. TO POQUANTICUT BROOK EASTON, MASS. MA 00779 DECEMBER 1980

Figure 1



LOCATION PLAN

NEW POND DAM
EASTON, MASSACHUSETTS

SCALE: 1 : 25 000

ASEC CORPORATION

MANSFIELD QUADRANGLE 1979

NATIONAL DAM INSPECTION PROGRAM

PHASE 1 INSPECTION REPORT

PROJECT INFORMATION

SECTION 1

1.1 GENERAL

a. AUTHORITY

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. ASEC Corporation has been retained by the New England Division to inspect and report on selected dams in the state of Massachusetts. Authorization and notice to proceed were issued to ASEC Corporation under a letter of December 8, 1980, from William E. Hodgson, Colonel, Corps of Engineers. Contract No. DACW33-81-C-0023 has been assigned by the Corps of Engineers for this work.

b. PURPOSE OF INSPECTION

The purposes of the program are to:

I. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

II. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.

III. To update, verify and complete the National Inventory of Dams.

1.2 DESCRIPTION OF PROJECT

a. LOCATION

The dam is located off Route 106 & 123 about 1000 ft. east of the intersection of Route 123 with Route 106 in Easton, Massachusetts. Located on the Poquanticut Brook about 1/2 mile upstream of its confluence with the Mulberry Brook, the dam is shown on the Mansfield Quadrangle Map having coordinates latitude 42°-01.4' and longitude 71°-08.3' (See Figure 1). Also known as Fuller's Pond Dam, the dam impounds New Pond.

b. DESCRIPTION OF DAM AND APPURTENANT STRUCTURES

The dam is an earthen embankment with a vertical cut stone masonry wall forming the downstream face along most of the dam and a near vertical field stone wall along the upstream face. The embankment has a minimum top width of approximately 17 feet and a maximum height of 14 feet. The overall length of the dam is approximately 1100 feet, and contains a right angle bend at approximate station 8+45 ft (see Sketch Plan in Appendix B page B-1). The dam has two spillways: a main spillway located near the center of the dam, and an emergency spillway located near the right end of the dam. The main spillway is an 8 ft. wide concrete faced stone channel controlled with stoplogs. The total height of

this outlet is 9.6 ft. without stoplogs, but at the time of inspection 5.5 ft. of stoplogs were in place leaving 4.1 ft. of freeboard. The width of each stoplog weir is 3.5 ft. giving a total weir length of 7.0 ft. About 20 ft. downstream of the spillway, discharge flows under Route 106 & 123 through twin stone culverts. The emergency spillway is approximately 9 ft. wide with stone sidewalls and a natural floor. The downstream portion of the spillway has apparently been filled in during reconstruction of Route 106 & 123, so that its flow capacity is negligible. There are no formal operational procedures at this dam, apparently abutters assist in regulating the water level of the dam.

c. SIZE CLASSIFICATION - "Small"

According to the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, a dam is classified as "Small" in size if the height is between 25 and 40 feet, or the dam impounds between 50 and 1000 acre-feet. The dam has a maximum height of about 14 feet and a maximum storage capacity of about 150 acre-feet. Therefore the dam is classified as small in size based on storage capacity.

d. HAZARD CLASSIFICATION - "Significant"

Based on the Corps of Engineers' Recommended Guidelines for the Safety Inspection of Dams, the Hazard Classification for the dam is "Significant". The dam is classified as a "Significant" Hazard Potential structure because failure may cause the loss of a few lives and appreciable economic loss. The assumed dam failure may affect 5 homes and 2 other buildings causing post-failure

flooding of 1 - 2 ft. over prefailure flooding, wash out Route 106 & 123, and damage an 18 inch water main paralleling this roadway. See Appendix D for failure analysis.

e. OWNERSHIP

Former Owner : Charles L. Fuller

Present Owner : Trustees of Charles L. Fuller Trust
c/o Brockton Enterprise
60 Main Street
Brockton, MA 02401
(617) 586-6200

f. OPERATOR Mr. Raymond J. Smith
Property Manager
Brockton Enterprise
60 Main Street
Brockton, MA 02401
(617) 586-6200 Ext. 223

g. PURPOSE OF DAM

The dam impounds New Pond located on the Poquanticut Brook. It formerly provided irrigation water for the Hammond-Fuller cranberry bogs. At the present the reservoir continues to service some bogs approximately 2 miles downstream, although the owners of the bog apparently have no control of the dam operations. The entire reservoir area is posted "No Trespassing", however, fishing is allowed from the shore only at locations near the dam structure.

h. DESIGN AND CONSTRUCTION HISTORY

Design plans for the original dam are not known to exist. The original construction date of the dam is unknown, but it does appear that the dam existed well before the year 1900. The structure has been periodically maintained and/or repaired. In 1961 modifications and repairs were made to the main spillway. Improvements designed in 1969 consisting of an additional spillway were never constructed.

i. NORMAL OPERATIONAL PROCEDURES

There are no formal operational procedures at this dam. The operator visits the site and adjusts stoplogs after heavy rains. In many instances he finds that the stoplogs have already been adjusted. Apparently certain abutters are voluntarily regulating the dam.

1.3 PERTINENT DATA

a. DRAINAGE AREA

The drainage area above the dam is 4.8 square miles. The watershed is characterized by marshy areas, ponds and irregular topography that ranges from El. 134 $\pm$ to El. 350$\pm$ ft. NGVD.

b. DISCHARGE AT DAMSITE

The discharge at the dam is controlled by two bays of stoplogs at the main spillway. About 20 ft. downstream of the spillway, discharge flows under Route 106 & 123 through twin stone culverts. An emergency spillway approximately 9 ft. wide is located near the right end of the dam. Because of modifications raising the roadway in the vicinity of the spillway, the discharge from the spillway is negligible.

h. DESIGN AND CONSTRUCTION HISTORY

Design plans for the original dam are not known to exist. The original construction date of the dam is unknown, but it does appear that the dam existed well before the year 1900. The structure has been periodically maintained and/or repaired. In 1961 modifications and repairs were made to the main spillway. Improvements designed in 1969 consisting of an additional spillway were never constructed.

NGVD = National Geodetic Vertical Datum

1.	Outlet Works (conduit) Size:	None
2.	Maximum Known Flood at Damsite:	Overtopped August, 1955 & March, 1968
3.	Ungated Spillway Capacity	
3a.	Main Spillway with Stoplogs* at Top of Dam	200 cfs
	Elevation:	138.4 ft.
	Main Spillway w/o Stoplogs at Top of Dam	625 cfs
	Elevation:	138.4 ft.
3b.	Emergency Spillway: at Top of Dam:	Negligible
	Elevation:	138.4 ft.
4.	Ungated Spillway Capacity	
4a.	Main Spillway with Stoplogs* at Test Flood Elevation	200 cfs
	Elevation:	138.8 ft.
	Main Spillway w/o Stoplogs at Test Flood Elevation	650 cfs
	Elevation:	138.8 ft.

4b.	Emergency Spillway: at Test Flood Elevation: Elevation:	 Negligible 138.8 ft.
5.	Gated Spillway Capacity at Normal Pool Elevation Elevation:	Not applicable
6.	Gated Spillway Capacity at Test Flood Elevation Elevation:	Not applicable
7.	Total Spillway Capacity* at Test Flood Elevation Elevation:	 200 cfs 138.8
8.	Total Project Discharge* at top of Dam: Elevation:	 200 cfs 138.4 ft.
9.	Total Project Discharge at Test Flood Elevation: Elevation:	 900 cfs 138.8 ft.

c. ELEVATION - Feet above National Geodetic Vertical Datum

1.	Streambed at toe of dam	124.0
2.	Bottom of Cutoff	N/A

* with Stoplogs at El. 134.3 NGVD

3.	Maximum Tailwater	N/A
4.	Normal Pool	134.3
5.	Full Flood Control Pool	N/A
6.	Main Spillway Crest	
	with Stoplogs	134.3
	without Stoplogs	128.8
7.	Design Surcharge-Original Design	Unknown
8.	Top of Dam	138.4
9.	Test Flood Surcharge	138.8
d.	RESERVOIR - Length in feet	
1.	Normal Pool	1400
2.	Flood Control Pool	N/A
3.	Main Spillway Crest Pool	
	with Stoplogs*	1400
	without Stoplogs	Unknown
4.	Top of Dam	2100
5.	Test Flood Pool	2200
e.	STORAGE - Acre-feet	
1.	Normal pool	65
2.	Flood control pool	N/A
3.	Main Spillway Crest Pool	
	with Stoplogs*	65
	without Stoplogs	Unknown
4.	Top of Dam	150
5.	Test Flood Pool	150

* with Stoplogs at El. 134.3 NGVD

f.	RESERVOIR SURFACE - (Acres)	
1.	Normal Pool	18
2.	Flood Control Pool	N/A
3.	Main Spillway Crest Pool with Stoplogs* without Stoplogs	 18 Unknown
4.	Test Flood Pool	23
5.	Top of Dam	21
g.	DAM	
1.	Type	Earth embankment
2.	Length	1100 feet
3.	Height	14 feet
4.	Top Width	17 ft. minimum
5.	Side slopes	
	Upstream	Vertical
	Downstream	Vertical
6.	Zoning	Unknown
7.	Impervious Core	Unknown
8.	Cutoff	Unknown
9.	Grout curtain	Unknown
10.	Other	N/A
h.	DIVERSION AND REGULATING TUNNEL	N/A

* with Stoplogs at El. 134.3 NGVD

i. SPILLWAY	
MAIN SPILLWAY:	
1a. Type	Concrete faced stone masonry channel with stoplog weir
2a. Length of Weir	7.0 ft.
3a. Crest	El. 128.8
4a. Gates	Stoplogs
5a. Upstream channel	Not observed
6a. Downstream channel	Natural
7a. General	Stoplogs can vary from El. 128.8 to 136.4 ft.
EMERGENCY SPILLWAY:	
1b. Type	Broadcrested weir, natural floor, stone masonry sidewalls
2b. Length of Weir	9 ft.
3b. Crest	136.4 ft. NGVD *
4a. Gates	None
5a. Upstream channel	Natural
6b. Downstream channel	None - Roadway prevents all but a negligible amount of flow from flowing from this spillway.
7b. General	At present a negligible amount of flow from this spillway will run along shoulder of road to stone conduit downstream of main spillway
j. REGULATING OUTLETS	N/A

* Spillway partially filled in

ENGINEERING DATA

SECTION 2

2.1 DESIGN DATA

There was no design data available for review for this dam. An inspection of the dam was performed for the Bristol County Commissioners January 12, 1959 with reinspections 11/17/60, 7/22/67 & 3/19/68. An inspection was also performed by the Massachusetts Dept. of Public Works 6/28/79. Copies of these reports are included in Appendix B. As built measurements of the dam were made by the Massachusetts Dept. of Public Works in approximately 1972. A plan by Hayward & Boynton - Civil Engineers dated October 3, 1961 was reviewed. This plan detailed some recommended changes to the spillway of the dam, portions of which have been constructed. Location of this and other data is included in Appendix B.

2.2 CONSTRUCTION DATA

No construction data was available for review. The name of the contractor responsible for construction is unknown.

2.3 OPERATIONAL DATA

Records of the reservoir level or other operational data are not kept.

2.4 EVALUATION OF DATA

a. AVAILABILITY

Data reviewed was provided by the Bristol County Commissioners and by the Massachusetts Department of Public Works.

A list of the available reference material and their location is given in Appendix B.

b. ADEQUACY

The lack of depth of engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history, hydraulic and hydrologic calculations and sound engineering judgment.

c. VALIDITY

No design plans were reviewed, however inspection sketches reviewed appear to represent fairly existing conditions at the time of the visual inspection.

VISUAL INSPECTION

SECTION 3

3.1 FINDINGS

a. GENERAL

The visual inspection of the dam was conducted on December 11 and December 22, 1981. At the time of inspection, the water level of the dam was approximately 4 ft. below the top of the dam.

b. DAM

The dam is an earthen embankment with a vertical, cut stone masonry wall forming the downstream face along most of the dam and a near-vertical field stone wall along the upstream face (Overview Photo).

From Sta 0+0 to 8+55 the crest of the dam is about 25 ft. wide with vegetation consisting of grasses, brush and trees of varying density (Photo # 1). Trees to 37 inches in diameter and brush are generally concentrated along the upstream and downstream thirds of the crest while the middle third is a grassy area with a bare footpath and other partially unvegetated areas. Tree roots are commonly exposed across the crest. Many areas between the central footpath and the upstream wall have eroded leaving bare areas and small vertical scarps. One area of erosion was measured to be 15 ft. long by 7 ft. wide by 6 inches deep between station 1+83 and 1+98.

Between Sta 8+55 and 11+20 the crest is about 17 to 20 ft. wide. Along this section the center of the crest consists of a

relatively flat, bare, unpaved, 12 ft. wide dirt road (Photo # 2). The road surface is hard, and there are few depressions or irregularities. Vegetation along the edges of the crest consist of short brush, scattered trees up to 22 in. diameter, grass and occasional bare patches. Minor erosion is occurring along the sloping edges of the crest between the road and the upstream and downstream walls. Two animal burrows were observed on the crest near Sta 10+0: one was approximately 10 inches in diameter and 30 inches deep and the other was 14 inches in diameter and 24 inches deep.

The upstream face consists of an unmortared field stone masonry wall varying from 1 ft. to 6 ft. high. Stone dimensions range from approximately 0.5 to 5 ft. and average about 2 ft. The face of the wall appears to be somewhat irregular due to the uncut nature of the stone and possible minor displacements of the wall in the upstream direction. In several areas, stones have been displaced from the wall leaving gaps up to 7 ft. by 4 ft. by 2 ft. in dimension. Minor erosion and slumping occurs in several areas immediately behind the wall. Between Sta 3+37 and 3+43 a relatively large slump has developed resulting in a 6 ft. by 5 ft. by 3 ft. mass of earth and stone wall being displaced into the reservoir.

The downstream face consists of a near-vertical, unmortared, cut stone masonry wall that ranges in height from 1 ft. to 11 ft. Stone dimensions range from approximately 0.5 ft. to about 5 ft.

In many places stones have fallen out of the wall leaving spaces as large as 3 ft. by 2 ft. by 1 ft. In several areas there are minor bulges in the wall, and several blocks have been displaced several inches in the downstream direction. Seepage was observed at two places along the toe of the downstream wall: 1) along the right side of the main spillway below the floor level (Sta 3+25) (Photo # 3) and 2) at Sta 6+50 at the toe of the wall (Photo # 4). Seepage at Sta 6+50 was clear and contained yellow-orange flocs. Seepage in this area has collected in the adjacent drainage ditch forming a pond about 20 ft. wide and 1 ft. deep between Sta 6+25 and approximately 8+0. Additional minor ponding was observed in an abandoned channel downstream of the wall near Sta 8+55. This old channel was filled with leaves and debris, and, although there was ponding and wet spots in the channel bottom, there was no seepage observed from the dam.

The right abutment consists of natural ground which is separated from the embankment by a 10 ft. wide by 2 ft. deep emergency spillway channel which runs from the shoulder of the road to the reservoir. Near the left end of the dam, the road continues from the embankment to a natural earth abutment. Both abutments appear to be in good condition.

c. APPURTENANT STRUCTURES

Water exits the pond through a main spillway near Sta 3+25. The outlet is a combination stone, mortar, and concrete structure containing stoplogs. Minor erosion and slumping has occurred along

the upstream side of the right channel wall. The concrete facing over the stone masonry is in poor condition: it has separated from the wall in many places, and fallen off in others. Reinforcing rods are exposed in many areas. Evidence of seepage along the masonry-concrete interface was apparent. (Photo #'s 6,7,8). The stoplog control structure is approximately 8 ft. wide and contains a central concrete pier and a concrete brace at its top. The pier and brace concrete was in good condition. Stoplogs were in fair condition. Slots at the pier were in good condition, at the sidewalls in poor condition. Approximately 20 ft. downstream of this outlet flow from the dam travels through a stone conduit under Route 106 & 123.

Steel spreaders made from old railroad track span the outlet and inlet channel. These are unpainted and in fair condition.

A wooden bridge over this outlet was in poor condition. Most of the planks comprising the deck were missing and the remaining planks were rotten in many places. The longitudinal beams spanning the channel were of wood and were beginning to rot.

As previously noted, the emergency spillway is a shallow channel approximately 9 ft. wide at the right end of the dam. The channel has a natural soil bottom and is generally clear of debris. The sidewalls were of unmortared fieldstone. Trees were noted growing at the base of the right channel wall. The downstream portion of the spillway was filled in apparently due to the raising of Route 106 & 123, making its capacity negligible.

d. RESERVOIR AREA

The banks of the reservoir in the vicinity of the dam appeared in stable condition.

e. DOWNSTREAM CHANNEL

Immediately downstream of the outlet structure, the 12 ft. long by 8 ft. wide channel is bounded by mortar and stone walls and is clear of obstructions. After approximately 12 ft., the channel drops approximately 4 ft. and widens to 17 ft.; here the channel floor and walls consist of cobbles and boulders, the floor stones appear to occur naturally. Small branches and debris are scattered in the channel, but there are no major obstructions to the flow of water. An 18 inch cast iron pipe, a water pipe, spans this channel approximately 20 ft. downstream of the toe of the dam. The pipe is about 3 ft. above the channel floor. The water then flows under Route 106 & 123, through a twin stone culvert about 5 ft. high and 15 ft. wide (Photo # 9).

The abandoned channel near Sta 8+55 parallels Route 106 & 123 for approximately 1000 ft., there was no flow in this channel and it was filled in places to provide driveways for houses adjacent to the roadway.

3.2 EVALUATION

Based on the visual inspection, the dam appears to be in fair condition. The inspection disclosed the following items which may influence the long-term performance of the dam.

The concrete at the main spillway structure in the vicinity

of the stoplog slots is in a deteriorated condition. This may lead to eventual failure of the stoplog structure.

The bridge over the main spillway which provides access to the stoplogs is in a deteriorated condition. This makes access to the stoplogs and therefore control of the reservoir water level difficult.

Trees and brush are growing on the crest of the dam and immediately behind the upstream and downstream walls, and tree roots are commonly exposed across the crest. This can contribute to seepage problems if a tree is blown over or dies and the roots rot.

Minor to extensive erosion and slumping occuring on the crest between the central footpath and the upstream and downstream walls increases the possibility of breaching if the dam were overtopped.

Some areas of the upstream and downstream walls have small to large voids where stones have fallen out or slumping has occurred; in other areas, the walls bulge away from the centerline of the crest, reducing the stability of these walls.

Two animal burrows were observed on the crest, these may provide seepage paths through the dam.

Seepage and ponding were observed at two locations along the downstream wall, this may lead to piping along the toe of the dam, if the soils are susceptible to piping.

Minor erosion and slumping has occurring along the upstream side of the right channel wall of the main spillway reduces the stability of the channel.

The emergency spillway channel has been partially filled in, decreasing the discharge the dam is capable of passing.

OPERATIONAL AND MAINTENANCE PROCEDURES

SECTION 4

4.1 OPERATIONAL PROCEDURES

a. GENERAL

The apparent use of the reservoir is recreational. The entire area is posted "No Trespassing", however, fishing from the shore is allowed at locations near the dam structure. The dam formerly provided irrigation water for cranberry bogs downstream and continues to service some bogs although the owners of the bogs have no control over dam operations. There are no formal operational procedures for the dam. The dam is visited by the owner's personnel after heavy rains. At that time, the stoplogs of the main spillway are adjusted as required to control the pond water level.

b. DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

There is no formal warning system in effect.

4.2 MAINTENANCE PROCEDURES

a. GENERAL

There are no known routine maintenance procedures for the dam. There are no formal inspection procedures. The dam is not patrolled.

b. OPERATING FACILITIES

The stoplog control structure is the operational portion of this dam requiring maintenance. No formal maintenance procedures are known to exist.

4.3 EVALUATION

Present operational procedures should be modified to include establishment of a formal warning system: procedures should be established for monitoring the dam during periods of exceptionally heavy rainfall and notifying downstream authorities in the event of an emergency.

Present operational procedures should be further modified to include monthly visual inspections of the dam and appurtenances by the owner's personnel. Included in this inspection should be the inspection of the stoplog structure and the monitoring of the seepage at the dam noted in Section 3.1 b and 3.1 c.

A program of diligent and periodic maintenance including, but not limited to: brush and sapling removal, backfilling animal burrows with suitable well tamped material, cleaning debris from spillway and channel should be implemented.

A program of annual technical inspections by a qualified registered engineer should be instituted.

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

SECTION 5

5.1 GENERAL

New Pond Dam is located in a suburban area of Easton, Massachusetts. Its outlet flows to Mulberry Brook and then to Ward Pond, approximately 2 miles downstream. It has a drainage area of 4.8 square miles and a reservoir surface area of 18 acres at normal pool elevation. Outflow from the reservoir is controlled solely by 2 stoplog weirs each 3.5 ft. long.

5.2 DESIGN DATA

No design data was available for this study.

5.3 EXPERIENCE DATA

Experience data available was a Bristol County, Mass. Inspection Report and Data for Dams with an original date of 1-12-59 indicates that the dam was overtopped in 1955 and 1968.

5.4 TEST FLOOD ANALYSIS

Based on the Corps of Engineers Recommended Guidelines for the Safety Inspection of Dams, the size of the dam is small. The dam has approximately 150 acre-feet of storage. Based on dam failure analysis and the above Guidelines the dam is classified as "Significant" hazard potential.

Based on the Corps of Engineers' guidelines the Test Flood should be in the range between the 100 year and 1/2 Probable Maximum Flood (PMF). Because of the size of the impoundment, a test flood equal to the 1/4 PMF, which is in this range, was

selected. Use of the Corps of Engineers' guide curves for "flat & coastal" terrain results in a peak inflow of about 950 cfs or 200 cfs per sq. mi. Assuming the pond level as that encountered during the visual inspection (El. 134 ft. ±) and the pond spreading laterally as it rises, storage calculations were made. Using the Corps of Engineers' "Surcharge Routing Alternative" an outflow from the reservoir of about 900 cfs was calculated. When this outflow is applied to the elevation - discharge curve for the dam, the Test Flood elevation is 0.4 ft. over the top of the dam embankment. The main spillway carries about 200 cfs or 20% of the the test flood. The discharge from the emergency spillway at the right of the dam was considered negligible due to the fact that the emergency spillway was partially filled in.

5.5 DAM FAILURE ANALYSIS

A dam failure analysis was made using the "Rule of Thumb Guidance" provided by the Corps of Engineers. Failure was assumed with water level at the top of the dam, El.138.4 ft. NGVD. Breach outflow for a breach width of 60 ft. (not including the spillway) was calculated as about 5,700 cfs compared to about 200 cfs prior to failure. For purposes of this analysis Route 106 & 123 was assumed to fail and offer no attenuation of downstream flows.

Table 1 summarizes the effects of the assumed dam failure. On the basis of the assumed failure the dam is classified as a

"Significant" hazard potential: a breach of the dam may subject 5 homes and 2 other buildings to post-failure flooding of approximately 1 - 2 ft. compared to little pre-failure flooding, causing the possible loss of a few lives and appreciable economic loss. Dam breach calculations and the approximate downstream impact area are included in Appendix D.

The table below summarizes the downstream effect of failure of New Pond Dam:

Location No. (see map)	Distance D/S of Dam (ft.)	Number of Structures	Level Above Stream (ft.)	Flow (cfs) Stage (ft. above stream) Before Failure	After Failure	Comments
1	36	road	8-9	186/1.8	5699/11.5	Great danger to Route 106 (Probable washout).
2	36 -66			186/1.5	5654/6.4	
3	66 -1780	0	-	186/2.1	3528/7.3	No structures or inhabited areas.
4	1780 -3673	0	-	186/1.9	1334/8.4	No structures or inhabited areas.
5	3673 -3793	2 residences road	8-9	186/1.8	1253/9.1	Possible washout to South Minor flooding to residenc (~1 foot). Little chance life.
6	3793 -4768	3 residences	3	186/1.5	844/4.3	Shallow flooding (~1-2 fee danger of loss of life.
7	4768 -5918	2 structures at dairy farm	3	186/1.5	809/4.0	Minor flooding (~1 foot). Little danger of loss of l

Table 1 - Summary of Downstream Flooding

EVALUATION OF STRUCTURAL STABILITY

SECTION 6

6.1 VISUAL OBSERVATIONS

The visual observations did not disclose any immediate stability problems. However, the concrete deterioration in the vicinity of the main spillway's stoplog control structure, the trees growing along the crest, continued deterioration of the upstream wall, erosion and slumping above the wall, along with continued deterioration of and seepage through the downstream stone masonry could effect the long term performance of the dam.

6.2 DESIGN AND CONSTRUCTION DATA

No design and construction data was available. Thus, the evaluation of stability is based solely on visual inspection.

6.3 POST CONSTRUCTION CHANGES

It appears from the visual inspection that repairs have at one time been made to the main spillway structure. These repairs appear to conform with the design plan reviewed.

6.4 SEISMIC STABILITY

The dam is located in Seismic Zone 2 and, in accordance with Phase 1 guidelines, does not warrant seismic analysis.

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

SECTION 7

7.1 DAM ASSESSMENT

a. CONDITION

On the basis of the visual inspection the dam is judged to be in fair condition. The following conditions can effect the long term performance of the dam.

The concrete at the main spillway structure in the vicinity of the stoplog slots is in a deteriorated condition. This may lead to eventual failure of the stoplog structure.

The bridge over the main spillway which provides access to the stoplogs is in a deteriorated condition. This makes access to the stoplogs and therefore control of the reservoir water level difficult.

Trees and brush are growing on the crest of the dam and immediately behind the upstream and downstream walls, and tree roots are commonly exposed across the crest. This can contribute to seepage problems if a tree is blown over or dies and the roots rot.

Minor to extensive erosion and slumping occuring on the crest between the central footpath and the upstream and downstream walls increases the possibility of breaching if the dam were overtopped.

Some areas of the upstream and downstream walls have small to large voids where stones have fallen out or slumping has

occurred; in other areas, the walls bulge away from the centerline of the crest, reducing the stability of these walls.

Two animal burrows were observed on the crest, these may provide seepage paths through the dam.

Seepage and ponding were observed at two locations along the downstream wall, this may lead to piping along the toe of the dam, if the soils are susceptible to piping.

Minor erosion and slumping occurring along the upstream side of the right channel wall of the main spillway reduces the stability of the channel.

b. ADEQUACY OF INFORMATION

The lack of in-depth engineering data did not allow for a definitive review. The condition of the dam was therefore based on the results of the visual inspection.

c. URGENCY

The recommendations presented in Sections 7.2 and 7.3 should be carried out within one year of receipt of this report by the owner.

7.2 RECOMMENDATIONS

The following recommendations should be carried out under the direction of a qualified, registered engineer.

1. The sources and paths of seepage through the joints of the stone masonry wall forming the downstream face of the dam should be investigated to determine the potential effects of seepage on the stability of the dam. Remedial measures should be designed as required.

2. Determine procedure for removal of trees growing on the crest and abutments and adjacent to the toe of the downstream face, including selection of suitable fill materials for backfilling the voids left after removal of the root systems.

3. Investigate and repair all loose and displaced blocks in the stone walls forming the upstream and downstream faces, and the outlet channel. Any gaps due to fallen-out blocks should be filled with proper sized stone.

4. Procedures for the repair of areas of erosion and slumping along the crest, particularly larger areas on the upstream edge, should be developed and implemented.

5. Repairs to the main spillway concrete facing should be designed and implemented.

6. Perform a detailed hydrologic-hydraulic investigation to assess further the potential of overtopping the dam and the need for and means to increase project discharge capacity. Included in this study should be an assessment of the effects of the recosnstruction of the Route 106 & 123 roadway at the emergency spillway.

7.3 REMEDIAL MEASURES

a. OPERATION AND MAINTENANCE PROCEDURES

1. The dam and appurtenant structures should be visually inspected once a month.

2. A technical inspection of the dam should be performed once a year by a qualified, registered engineer.

3. A formal warning system to include monitoring of the dam during extremely heavy rains, and procedures for notifying downstream authorities in the event of an emergency should be instituted.

4. The owner should prevent brush and trees from growing on the crest, abutments, upstream face, and downstream face.

5. Planking should be replaced on the access bridge over the main spillway. Railings should be provided.

6. A program of diligent and periodic maintenance including, but not limited to: brush and sapling removal, backfilling animal burrows with suitable well tamped material, cleaning debris from spillway and channel should be established and implemented.

7.4 ALTERNATIVES

There are no practical alternatives to the above recommendations.

APPENDIX A

VISUAL CHECKLIST WITH COMMENTS

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT NEW POND DAM

DATE DECEMBER 11, 1980
& DECEMBER 22, 1980
WEATHER CLEAR, COLD
W.S. EL. 138.4 U.S.
134.4 D.S.

PARTY:

1. John F. Modzelewski P.E. ASEC Corporation - Civil/Structural
2. Richard M. Baker Vollmer Associates Inc. - Hydrologist
3. Richard F. Murdock P.E. Geotechnical Engineers Inc. - Geotechnical
4. Richard W. Turnbull Geotechnical Engineers Inc. - Geotechnical

PROJECT FEATURE	INSPECTED BY
1. Dam Embankment	GEI
2. Dike Embankment	None observed
3. Outlet Works - Intake Channel Intake Structure	None observed
4. Outlet Works - Control Tower	None observed
5. Outlet Works - Transition & Conduit	None observed
6. Outlet Works - Outlet Structure & Outlet Channel	None observed
7. Outlet Works - Spillway Weir, Approach & Discharge Channels	ASEC, GEI
8. Outlet Works - Service Bridge	ASEC

PERIODIC INSPECTION CHECKLIST

PROJECT NEW POND DAM — DATE Dec. 22 & Dec. 11, 1980

PROJECT FEATURE see below — NAME JFM, RFM, RWT

DISCIPLINE Civil Engineer, Geotechnical Engineer — NAME

AREA EVALUATED	CONDITION
DAM EMBANKMENT	Earth embankments with vertical upstream and downstream unmortared field stone masonry walls.
Crest Elevation	El. 138.4
Current Pool Elevation	El. 134.4 (Dec. 22, 1981)
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed.
Pavement Condition	Unpaved roadway Sta 8+55 to 11+20.
Movement or Settlement of Crest	Minor depressions and irregularities.
Lateral Movement	None observed.
Vertical Alignment	Bulge in downstream wall at Sta 5+80.
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	
Sloughing or Erosion of Slopes or Abutments	
Rock Slope Protection - Riprap Failures	
Unusual Movement or Cracking at or Near Toe	
Unusual Embankment or Downstream Seepage	
Piping or Boils	None observed.
Foundation Drainage Features	None observed.
Toe Drains	None observed.
Instrumentation System	None observed.
Vegetation	

PERIODIC INSPECTION CHECKLIST

PROJECT NEW POND DAM DATE Dec. 11, 1980

PROJECT FEATURE see below NAME JFM, RFM, RWT

DISCIPLINE Civil Engineer, Geotechnical Engineer NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Stone masonry approach channel faced with concrete. Concrete is cracked and erosion is evident along the right channel wall.
General Condition	Poor
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Not observed
b. Weir and Training Walls	
General Condition of Concrete	Poor, stone masonry sidewalls have been faced with 4" ± concrete. Pieces of concrete have fallen away from both sidewalls exposing stone. Observed portion of central concrete pier in good condition. Flashboards in fair condition.
Rust or Staining N/A	
Spalling N/A	
Any Visible Reinforcing - Yes	
Any Seepage or Efflorescence - N/A	Seepage evident along both sidewalls
Drain Holes	None observed
c. Discharge Channel	
General Condition	Good - Minor debris in channel, discharge passes under Route 106 & 123 through twin stone culverts
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Channel	Natural floor , minor debris in floor
Other Obstructions	18" C.I. pipe crosses channel upstream of twin culverts.
Other Comments	

PERIODIC INSPECTION CHECKLIST

PROJECT NEW POND DAM DATE Dec. 11, 1980 & Dec. 22, 1980

PROJECT FEATURE see below NAME JFM, RFM, RWT

DISCIPLINE Civil Engineer, Geotechnical Engineer NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS - EMERGENCY SPILLWAY	
a. Approach Channel	
General Condition	Fair to good.
Loose Rock Overhanging Channel	Minor.
Trees Overhanging Channel	None.
Floor of Approach Channel	Clear.
b. Weir and Training Walls	
General Condition of Concrete	N/A - Stone Masonry sidewalls with natural channel floor. Trees growing along base of right sidewall.
Rust or Staining - N/A	
Spalling	N/A
Any Visible Reinforcing	N/A
Any Seepage or Efflorescence	N/A
Drain Holes	None.
c. Discharge Channel	
General Condition	Fair to good.
Loose Rock Overhanging Channel	Minor.
Trees Overhanging Channel	None.
Floor of Channel	Clear.
Other Obstructions	None.
Other Comments	Discharge from the emergency spillway would apparently travel along the shoulder of of Route 106 & 123 to the stone conduit under this road at the main spillway.

PERIODIC INSPECTION CHECKLIST

PROJECT NEW POND DAM DATE Dec. 22, 1980

PROJECT FEATURE see below NAME JFM

DISCIPLINE Civil/Structural Engineer NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	Service bridge consists of wood planking spanning between sidewalls of spillway.
Bearings	Planking is missing and remaining planking is in poor condition. Carrying beams are in fair condition.
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Underside of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	Beams are supported on spillway sidewalls. See OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS for inspection.
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

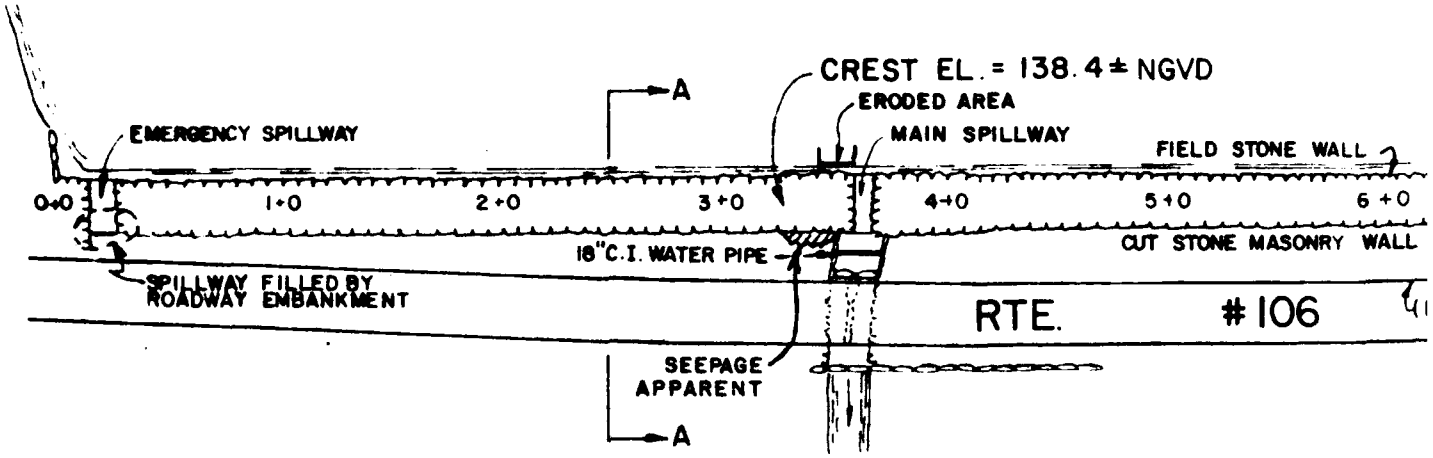
APPENDIX B

ENGINEERING DATA

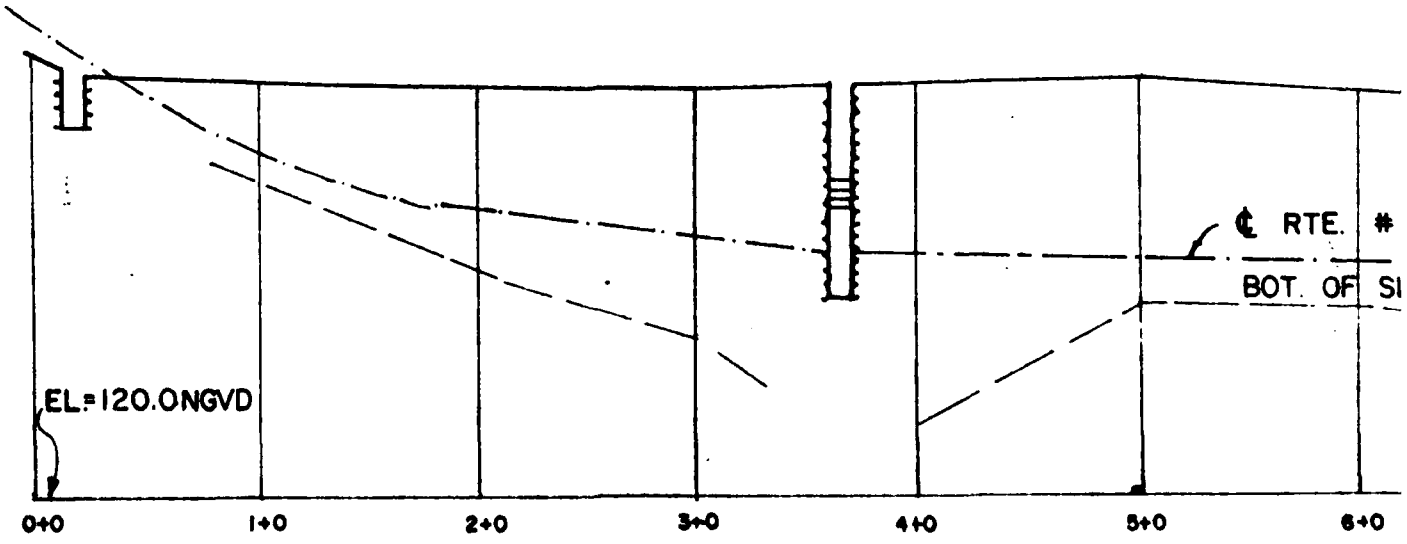
NOTE:
SKETCH PLAN ONLY.
PREPARED SOLELY FOR THE PURPOSES
OF PHASE I INSPECTION REPORT

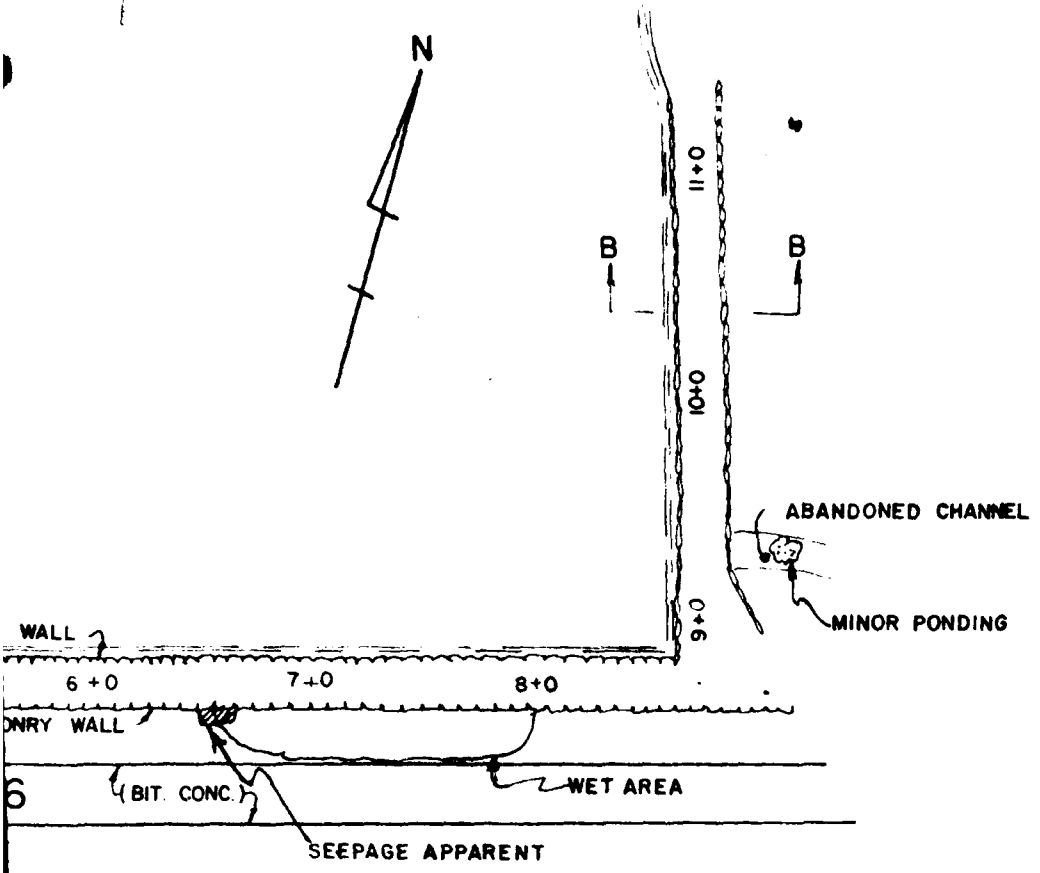
NEW POND

WATER EL. = 134.4 (12-10-80) NGVD



PLAN SCALE: 1" = 80'





SECTION

SCALE: 1'

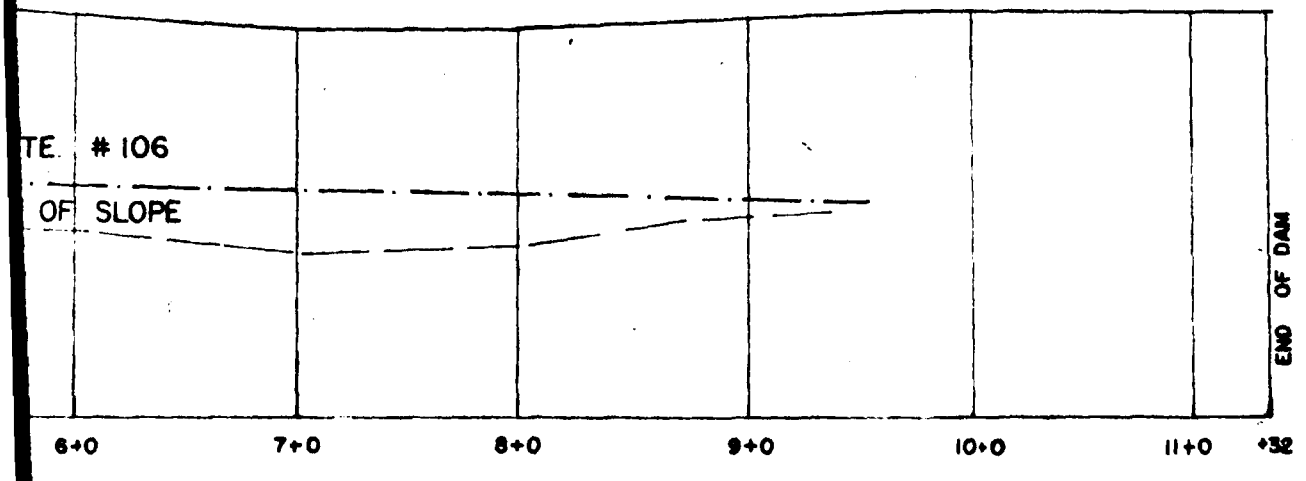
SECTION

SCALE: 1'

PROFILE SCALE

HORIZ.: 1"= 80'

VERT.: 1"= 8'



ASEC CORP
CONSULTING
BOSTON, M

NATIONAL

DRAWN	C
J.B.S.	J.

FIG. 2

IDONED CHANNEL

IINOR PONDING

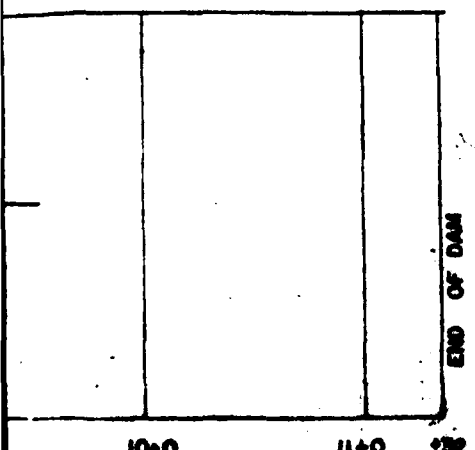
SECTION A-A

SCALE: 1" = 20'

SECTION B-B

SCALE: 1" = 20'

E



ASEC CORPORATION *CONSULTING ENGINEERS* BOSTON, MASS.	U.S. ARMY ENGINEER DIV. NEW ENGLAND *CORPS OF ENGINEERS* WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

NEW POND DAM
EASTON, MASS.

MASS.# 00779

DRAWN	CHECKED	APPROVED	SCALE	DATE	
J.B.S.	J.F.M.	J.F.M.	As shown	MAY, 1978	

LIST OF REFERENCES

REFERENCE	LOCATION
1. Fuller Estates Spillway Recommended Structural Revisions Dated October 3, 1961 By Hayward, Hayward & Boynton, Brockton, MA	County of Bristol, Massachusetts Engineering Department
2. Inspection Report - Dams & Reservoirs Dam # 6-3-88-8 Dated 6-28-79	Mass. Dept. of Environmental Quality Engineering Division of Waterways 1 - 11 Winter Street Boston, MA 02110 Tel. (617) 727-4797
3. Bristol County, Mass. Inspection Report & Data for Dams Dated 1-12-59 with reinspections	Mass. Dept. of Environmental Quality Engineering Division of Waterways 1 - 11 Winter Street Boston, MA 02110 Tel. (617) 727-4797

2 of 4:6

INSPECTION REPORT - DAMS AND RESERVOIRS

Location: City/Town Easton. Dam No. 6-3-88-8

Name of Dam New Pond. Inspected by: Iadalbe-Pacillo

Date of Inspection 6-28-79

2.) Owner/s: per: Assessors_____. Prev. Inspection 3-12-70.

Reg. of Deeds_____. Pers. Contact_____.

1. Trustees of C.L. Fuller Brockton Enterprise 60 Main St. Brockton

Name | St. & no. | City/Town | State | Tel. no.

2. _____

Name | St. & no. | City/Town | State | Tel. no.

3. _____

Name | St. & no. | City/Town | State | Tel. no.

3.) Caretaker: (if any) e.g. superintendant, plant manager, appointed by absentee owner, appointed by multi owners.

_____

Name | St. & no. | City/Town | State | Tel. no.

4.) No. of Pictures taken 1.

5.) Degree of Hazard: (if dam should fail completely)*

1. Minor_____. 2. Moderate_____.

2. Severe X. 4. Disastrous_____.

* This rating may change as land use changes (future development)

6.) Outlet Control: Automatic_____. Manual_____.

Operative X yes ;_____No.

Comments: Stop logs in place 5' ±

7.) Upstream Face of Dam: Condition:

1. Good_____. 2. Minor Repairs X.

3. Major Repairs_____. 4. Urgent Repairs_____.

Comments: Trees and brush should be cleared

DAM NO. 6-3-88-8

8. Downstream Face of Dam: Condition: 1. Good_____. 2. Minor Repairs X.
3. Major Repairs____. 4. Urgent Repairs_____.

Comments: Trees and brush should be cleared

9. Emergency Spillway: Condition: 1. Good_____. 2. Minor Repairs /.
3. Major Repairs____. 4. Urgent Repairs_____.

Comments: NONE

10. Water level @ time of inspection: 3.75 ft. above_____. below X.
top of dam_____. principal spillway X.
other_____.

Summary of Deficiencies Noted:

Growth (Trees and Brush) on Embankment X.
Animal Burrows and Washouts —.
Damage to slopes or top of dam —.
Cracked or Damaged Masonry X.
Evidence of Seepage —.
Evidence of Piping —.
Erosion —.
Leaks —.
Trash and/or debis impeding flow —.
Clogged or blocked spillway —.
Other —.

DAM NO. 6-3-88-8

(12) Remarks & Recommendations: (Fully Explain)

PREVIOUS INSPECTION REPORT STATES SPILLWAY INADEQUATE - STRONGLY RECOMMENDS OWNER BUILD LARGER SLUICE.

(13) Overall Condition:

1. Safe_____.
2. Minor repairs needed_____.
3. Conditionally safe - major repairs needed X .
4. Unsafe_____.
5. Reservoir impoundment no longer exists (explain)

   Recommend removal from inspection list_____.

BRISTOL COUNTY, MASS.

INSPECTION REPORT & DATA FOR DAMS

PREPARED FOR THE BRISTOL COUNTY COMMISSIONERS
BY HAYDEN, HARDING & BUCHANAN, INC., BOSTON, MASS.

Dam No. Ea-8
Town: Easton
Stream: Poquanticut Brook
Pond: Fullers or New Pond
Date: 1-12-59
By: JHR

Owner: Trustees of C. L. Fuller
His Address: Brocton Enterprise, 60 Main St. Brocton
Function of Dam: Recreation Attn: C.A. Fuller
Location & Access: North of Foundry Street (106)

USGS Quad. Mansfield Lat. 42°43'25" Long. 71°08'20"

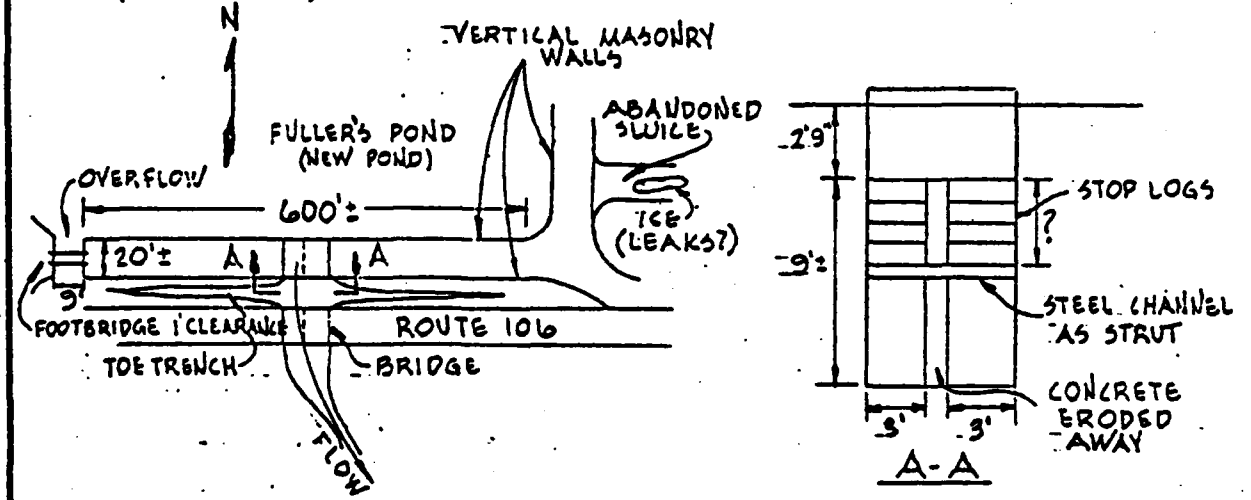
CONDITION RATING
Structural:
Hydraulic:
General: Fair
PRIORITY: 1 **

Drainage Area: 5.4 sq.mi.; Ponds: ac.; Res.@dam: ac.
Character of D.A.: Gently sloping with some storage
Estimated Discharge Capacity: About 520 cfs

KINNISON-COLBY FLOODS
Minor: 265 cfs
Major: 535 cfs
Rare: 870 cfs
Maximum: 4040 cfs

General Description of Dam and Discharge Control: Earth embankment with vertical masonry walls up and downstream, 12' ± high. -- center sluice with stoplogs
Toe trench on downstream side.

Sketch (Not to Scale):



Remarks and Recommendations: Evidence of cracking in walls at gate.

Bridge downstream appears inadequate -- if dam failed, road would wash out. Dam proper in fair condition, but spillway inadequate. Dam overtopped in 1955 & '68. Recommended larger overflow -- increase bridge capacity

* Change Priority to 1 4-1-68

Rte. 106 New Construction has filled toe trench to the west

Re-inspection

Date	By	Comment
11-17-60	AAV	Generally same condition. Edge of pavement near dam is deteriorated possibly due to water action in trench. Westerly overflow better sealed off.
7-22-67	WEL	See Memo 7-24-67
3-19-68	WEL	Overtopped easterly side logs in

Dam No. Ea-8

** Letter 3 Oct. 62

BRISTOL COUNTY, MASS.
INSPECTION REPORT FOR DAMS

PREPARED FOR THE BRISTOL COUNTY COMMISSIONERS
BY UNIVERSAL ENGINEERING CORP., BOSTON, MASS.

DAM NO. Ea-8
TOWN: Easton

INSPECTION DATE	REMARKS & RECOMMENDATIONS
3-12-70	Same condition as previous report. Sluice is inadequate. Leaking and flanking around the area of the sluice is presenting a major threat. It is strongly recommended that the owner have a larger sluice built before the entire dam collapses and washes out Route 106 and downstream property.

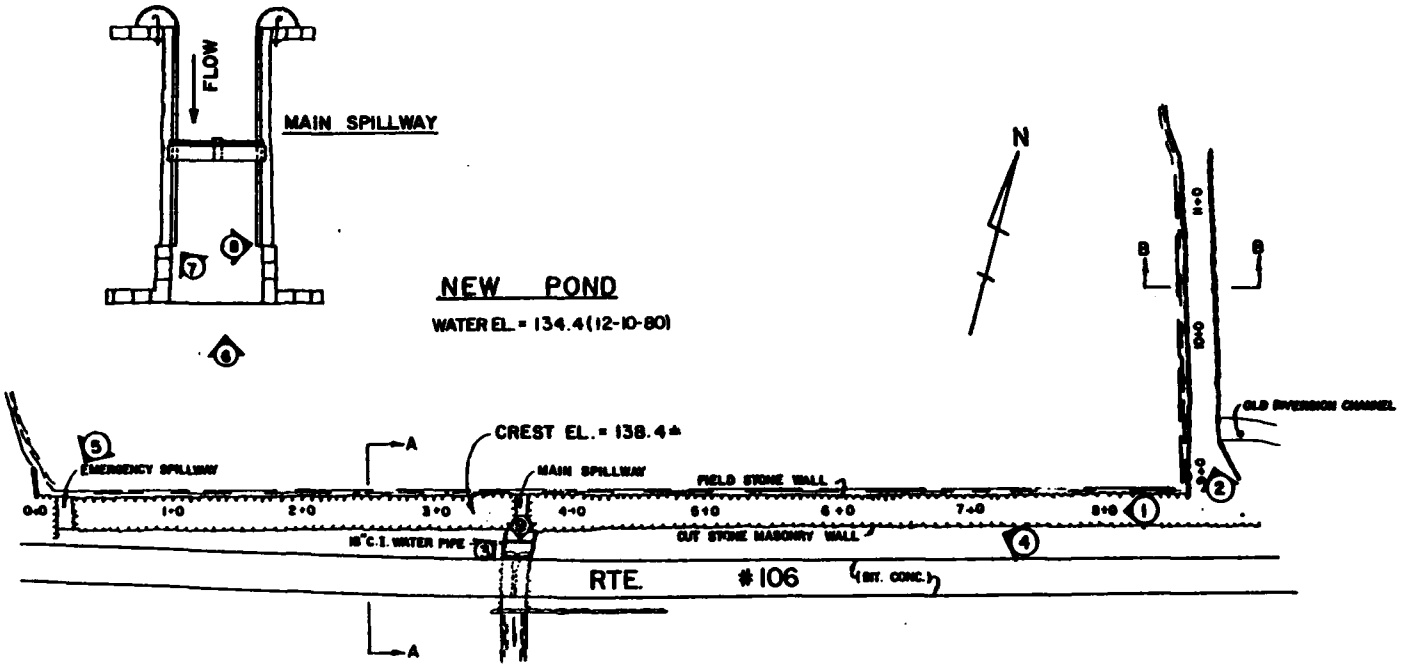
Supplement to original report and data by Hayden, Harding & Buchanan, Inc.

DAM NO. Ea-8

APPENDIX C

PHOTOGRAPHS

FIGURE 3



DENOTES PHOTO NUMBER AND DIRECTION IN WHICH PHOTO WAS TAKEN

ASEC CORPORATION *CONSULTING ENGINEERS* BOSTON, MASS. FEBRUARY 1981	PHOTO LOCATION PLAN NEW POND DAM MA 00779 EASTON, MASSACHUSETTS	U.S. ARMY ENGINEER DIV. NEW ENGLAND *CORPS OF ENGINEERS* WALTHAM, MASS.

Photo # 1 Crest of dam (Approximately 25 ft. wide)

Photo # 2 Crest of dam (Roadway approximately 12 ft. wide)

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM , MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	NEW POND DAM TR. TO POQUANTICUT BROOK EASTON, MASS. MA 00779 DECEMBER 1980
ASEC CORP. CONSULTING ENGINEERS BOSTON , MASSACHUSETTS		

Photo # 3 Seepage at downstream face right side of main spillway (Rod extended 5 ft.)

Photo # 4 Seepage at base of downstream wall

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	NEW POND DAM TR. TO POQUANTICUT BROOK EASTON, MASS. MA 00779 DECEMBER 1980
ASEC CORP. CONSULTING ENGINEERS BOSTON, MASSACHUSETTS		

Photo # 5 Emergency spillway

Photo # 6 Main spillway and bridge (Looking upstream)

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM , MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	NEW POND DAM TR. TO POQUANTICUT BROOK EASTON, MASS. MA 00779 DECEMBER 1980
ASEC CORP. CONSULTING ENGINEERS BOSTON , MASSACHUSETTS		

Photo # 7 Deteriorated concrete facing right side of main spillway (Rule extended 1 ft.)

Photo # 8 Seepage at left wall of main spillway (Rule extended 1 ft.)

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM , MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS	NEW POND DAM TR. TO POQUANTICUT BROOK EASTON, MASS. MA 00779 DECEMBER 1980
ASEC CORP. CONSULTING ENGINEERS BOSTON , MASSACHUSETTS		

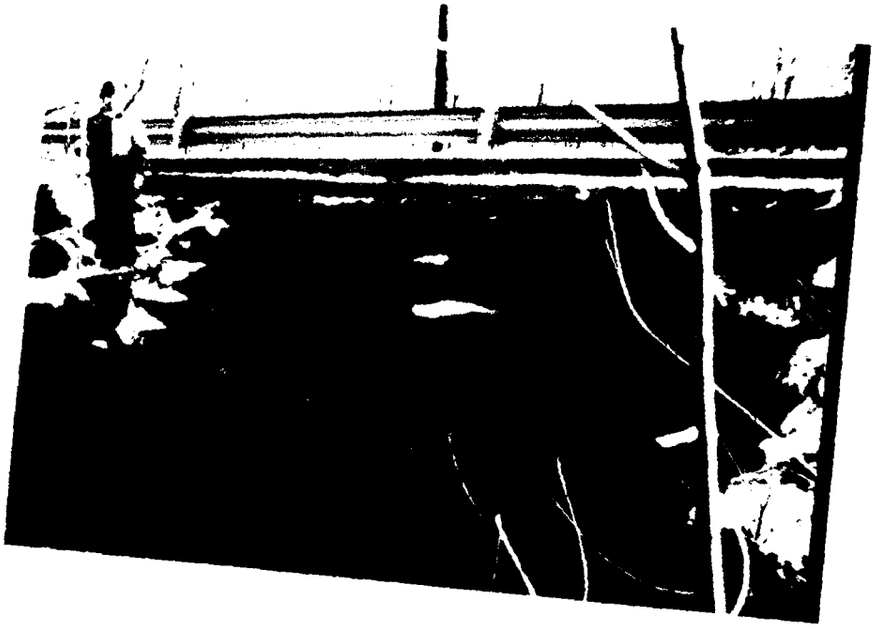


Photo # 9 Culvert and 18 inch waterline approximately 20 ft. downstream of main spillway.

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS ASEC CORP. CONSULTING ENGINEERS BOSTON, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS	NEW POND DAM TR. TO POQUANTICUT BROOK EASTON, MASS. MA 00779 DECEMBER 1980

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

NEW POND DAM

EASTON, MA

Dam Rating Curve

A schematic sketch of the dam and outlet structures is shown in Figure 1. The sketch is based on recent field inspection and survey of the site. This information was used in the hydrologic and hydraulic analysis of the dam. Elevation-discharge relations for the dam are shown on Graph #1.

Main Spillway Discharge

$Q_1 = CLH^{1.5}$

C = 3.2 (sharp-crested weir)

L = 3.5' for 2 weirs = 7.0'

H = head on spillway crest (datum elevation= 134.3' NGVD)

$Q_1 = 3.2 \times 7.0 \times H^{1.5}$

Left Dam Embankment Overflow Discharge

$Q_2 = CLH^{1.5}$

C = 2.8 (broad-crested)

L = 492'

H = head on embankment crest (datum elevation = 138.4' NGVD)

$Q_2 = 2.8 \times 492 \times H^{1.5}$

Right Dam Embankment Overflow Discharge

$Q_3 = CLH^{1.5}$

C = 2.8 (broad-crested)

L = 340'

H = head on embankment crest (datum elevation = 138.4' NGVD)

$Q_3 = 2.8 \times 340 \times H^{1.5}$

Left Sideslope Embankment Overflow Discharge

$Q_4 = CLH^{1.5}$

C = 2.8 (broad crested)

L = 6.25 x h

H = 0.5 x h, h = head on embankment crest (datum elevation = 138.4)

$Q_4 = 2.8 \times (6.25 \times h) \times (0.5 \times h)^{1.5}$

Right Sideslope Embankment Overflow Discharge

$Q_5 = CLH^{1.5}$

C = 2.8 (broad-crested)

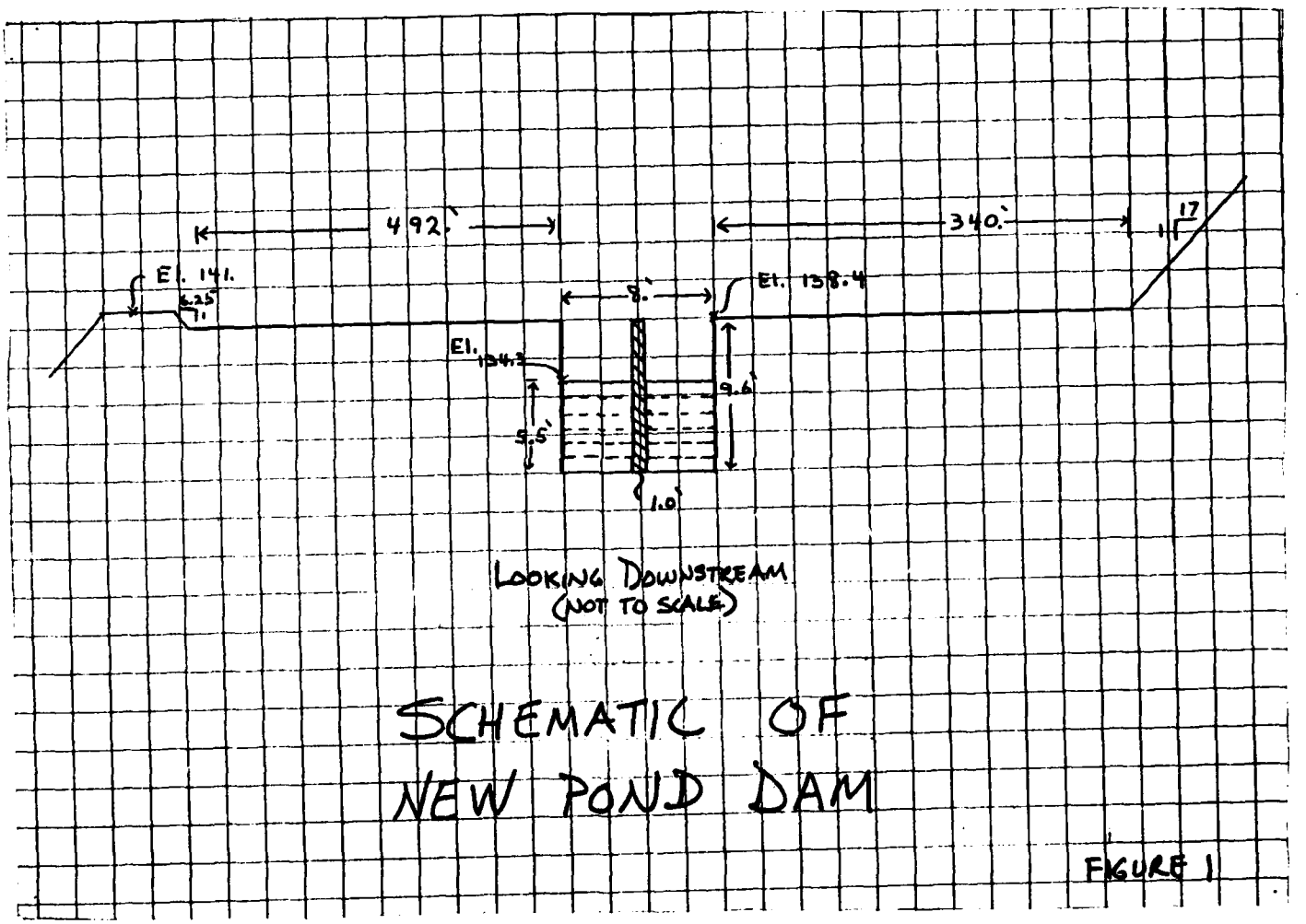
L = 17.0 x h

H = 0.5 x h, h = head on embankment (datum elevation = 138.4)

$Q5 = 2.8 \times (17.0 \times h) \times (0.5 \times h)^{1.5}$

Total Discharge

$Q_{Total} = Q_1 + Q_2 + Q_3 + Q_4 + Q_5$



SCHEMATIC OF
NEW POND DAM

FIGURE 1

DAM FAILURE ANALYSIS

Assume that the dam fails with the pool at maximum level, which corresponds to the elevation of the top of the embankment (138.4' NGVD). The top of the embankment is 4.1' above the spillway crest and 14.4' above its downstream invert. There are two spillways each 3.5' wide separated by a flash board support. The total height of the outlet is 9.6' without flashboards but at present two 5.5' high flashboards are in place. For purposes of the failure analysis, the Route 106-123 roadway embankment was assumed to have no impact on the dam failure.

Normal Outflow at Failure

Q = 186 CFS (dam rating at maximum pool - 138.4" NGVD -Graph 1).

Tailwater Level at Failure

Cross-sections located throughout the downstream impact area were coded and input into a HEC-2 multiple profile run using nine discharges covering the range of discharges expected during the dam failure analysis. Results were used to construct stage-discharge and stage-cross-section area curves for each cross-section (see Graphs 4-10).

The following are locations of cross-sections used in the dam failure analysis:

Distance D/S of Dam (FT)	Normal Water Level (FT-NGVD)*
36	124.2
66	123.5
1780	95
3673	92
3793	91
4768	86
5918	84

* Approximate elevation of normal flow in stream channel.

Immediately preceding failure, the normal outflow at maximum pool of 186 CFS results in an elevation of 125.0' NGVD at the section located 36' downstream of the pond.

Breach Outflow

$$Qp_1 = 8/27 \times Wb \times \sqrt{g} \times Y_o^{1.5}$$

where: Wb = width of breach

$\leq$ 0.4 x (width of dam at ½ height)

$\leq$ 0.4 x 150'

use: WB = 60'

Y_o = pool elevation - downstream invert = 14.4

$$Qp_1 = 8/27 \times 60 \times \sqrt{32.2} \times 14.4^{1.5} = 5{,}513 \text{ CFS}$$

Total Outflow

$$Q_{total} = 186 + 5{,}513 = 5{,}699$$

The table below gives pre-failure, downstream stages resulting from entering each section's stage-discharge curve at a discharge of 186 CFS (normal maximum pool outflow at failure).

Section (FT D/S of dam)	Pre-Failure Stage (FT NGVD)
36	125
66	124
1780	96
3673	92.5
3793	91.3
4768	87
5918	85

Impounding Capacities of Pond

Pool at top of dam (maximum - 138.4' NGVD)

Volume = 144 ACRE-FT

Pool at normal storage capacity

Volume = 65 ACRE-FT

Downstream Flooding

At 36' downstream of dam

Prior to failure

depth = 1.8' (Graph 4, with Q = 186 CFS)

After failure

depth = 135.7' - 123.2' = 12.5' (Graph 4, with Q = 5,699 CFS)

Reach from 36' downstream to 66' downstream of dam

To estimate peak dam break flow at a distance 66' downstream of dam, we follow the COE "Rule of Thumb Guidance for Estimating Downstream

Dam Failure Hydrographs."

Use stage-discharge and stage-cross-section area curves for sections 36' and 66' downstream of dam (Graphs 4 and 5).

Storage volume in reach-versus-outflow

Assume channel and overbank storage of the flood wave is equal to the reach length times the average of the upstream post-failure flow area minus the upstream pre-failure flow area and the downstream post-failure flow area minus the downstream pre-failure flow area.

$$\text{Volume } (Ft^3) = \left[\frac{\left((Ap_1 - A_{n_1}) + Ap_2 - A_{n_2} \right)}{2}\right] X \; L$$

where: Ap_1 = post-failure u/s cross-sectional flow area (Ft2)

A_{N_1} = pre-failure u/s cross-sectional flow area (Ft^2)

Ap_2 = post-failure d/s cross-sectional flow area (Ft2)

A_{N_2} = pre-failure d/s cross-sectional flow area (Ft^2)

L = reach length in feet

The attenuation of dam failure flow due to storage in the reach between 36' and 66' d/s:

$$Q_2 = 186 + Q_{p_1}\left(1 - \frac{V_1}{S}\right) = 186 + 5513 \left(1 - \frac{V_1}{144}\right)$$

where: V_1 = volume of storage in reach, above pre-failure stage (ACRE-FEET)

S = storage in reservoir before failure (ACRE-FEET)

Qp_1 = breach outflow at upstream end of reach

Q_2 = total outflow at downstream end of reach after dam failure.

The attenuation of the peak dam failure flow at the downstream end of this reach is calculated on Graph 5. The peak failure flow is reduced to 5,654 CFS at the section 66' d/s of the dam. The corresponding elevation of 129.9' NGVD is 5.9' above pre-failure stage and 6.4' above normal stream level.

In this reach the high danger area is that of Route 106-123 below the dam embankment. This main roadway would be overtopped by approximately 2-3 of high velocity flow greatly endangering any traffic present at a time of failure. The roadway embankment was assumed to have no impact on the dam failure and would probably be washed out by the failure flow.

In the next reach between 66' d/s and 1780' d/s of the dam, the flow is attenuated to 3528 CFS at an elevation of 102.3' NGVD. This elevation is 6.3' above pre-failure stage and 7.3' above the normal water level. No structures or inhabited areas would be inundate in this reach.

Between 1780' d/s and 3673' d/s of the dam, the peak failure flow is attenuated to 1334 CFS. The corresponding elevation is 100.4' NGVD which is 7.9' above pre-failure stage and 8.4' above the normal stream level. In this reach no structures or inhabited areas would receive flooding.

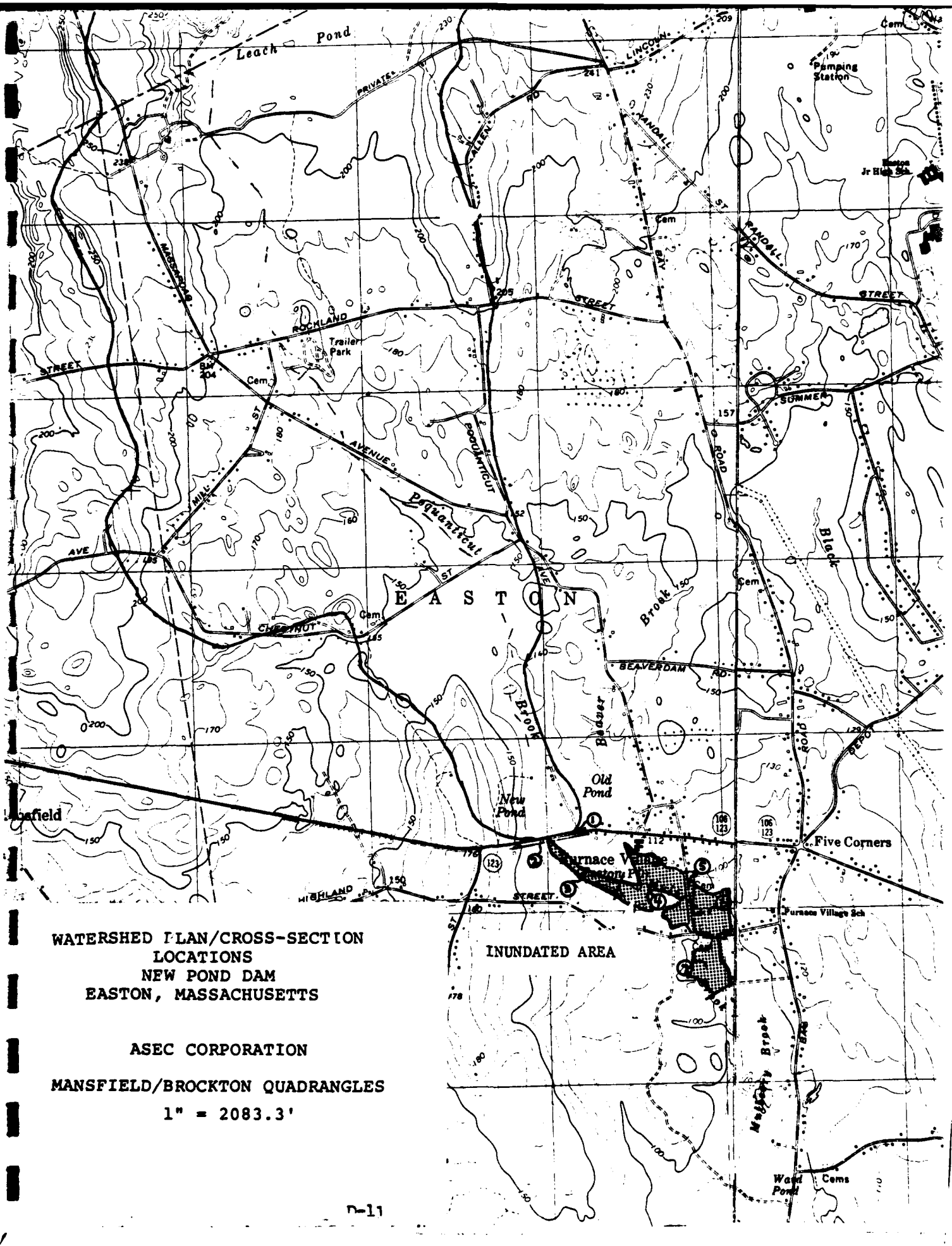
Between 3673' d/s and 3793' d/s of the dam, the peak failure flow is attenuated to 1253' CFS. The corresponding elevation is approximately 100.1' NGVD which is 8.8' above pre-failure stage and 9.1' above the normal stream level. South Street in this reach would be overtopped by approximately 2' of flow and 2 residences on the north and south side of Mulberry Brook would receive very shallow flooding of approximately 1' or less.

In the next reach between 3793' d/s and 4768' d/s of the dam, the failure flow is attenuated to 844 CFS with an elevation of 90.3' NGVD. This elevation is 4.3' above the normal stream level. In this reach, three residences on the east side of South Street just south of the Mulberry Brook crossing would experience shallow flooding of 1-2' in depth. Highland Street, however, would not be overtopped. In the reach between 4768' d/s and 5918' d/s of the dam, the peak failure flow is reduced to 809 CFS at elevation 88.0 ' NGVD. This elevation is 3.0' above pre-failure stage and 4.0' above the normal stream level. Two structures at a dairy farm would receive very shallow flooding of 1 foot or less.

Downstream of this reach, Mulberry Brook flows into a swampy area upstream of Ward Pond. The extensive storage of this area will quickly attenuate the peak failure discharge and corresponding stages to insignificant levels. Thus, no additional damage would be expected in the downstream areas.

e table below summarizes the downstream effect of failure of New Pond Dam:

tion map)	Distance D/S of Dam (ft.)	Number of Structures	Level Above Stream (ft.)	Flow (cfs) Stage (ft. above stream) Before Failure	After Failure	Comments
	36	road	8-9	186/1.8	5699/11.5	Great danger to Route 106 + 123. (Probable washout).
	36 -66			186/1.5	5654/6.4	
	66 -1780	0	-	186/2.1	3528/7.3	No structures or inhabited areas.
	1780 -3673	0	-	186/1.9	1334/8.4	No structures or inhabited areas.
	3673 -3793	2 residences road	8-9	186/1.8	1253/9.1	Possible washout to South Street. Minor flooding to residences (~1 foot). Little chance of loss o life.
	3793 -4768	3 residences	3	186/1.5	844/4.3	Shallow flooding (~1-2 feet). Littl danger of loss of life.
	4768 -5918	2 structures at dairy farm	3	186/1.5	809/4.0	Minor flooding (~1 foot). Little danger of loss of life.

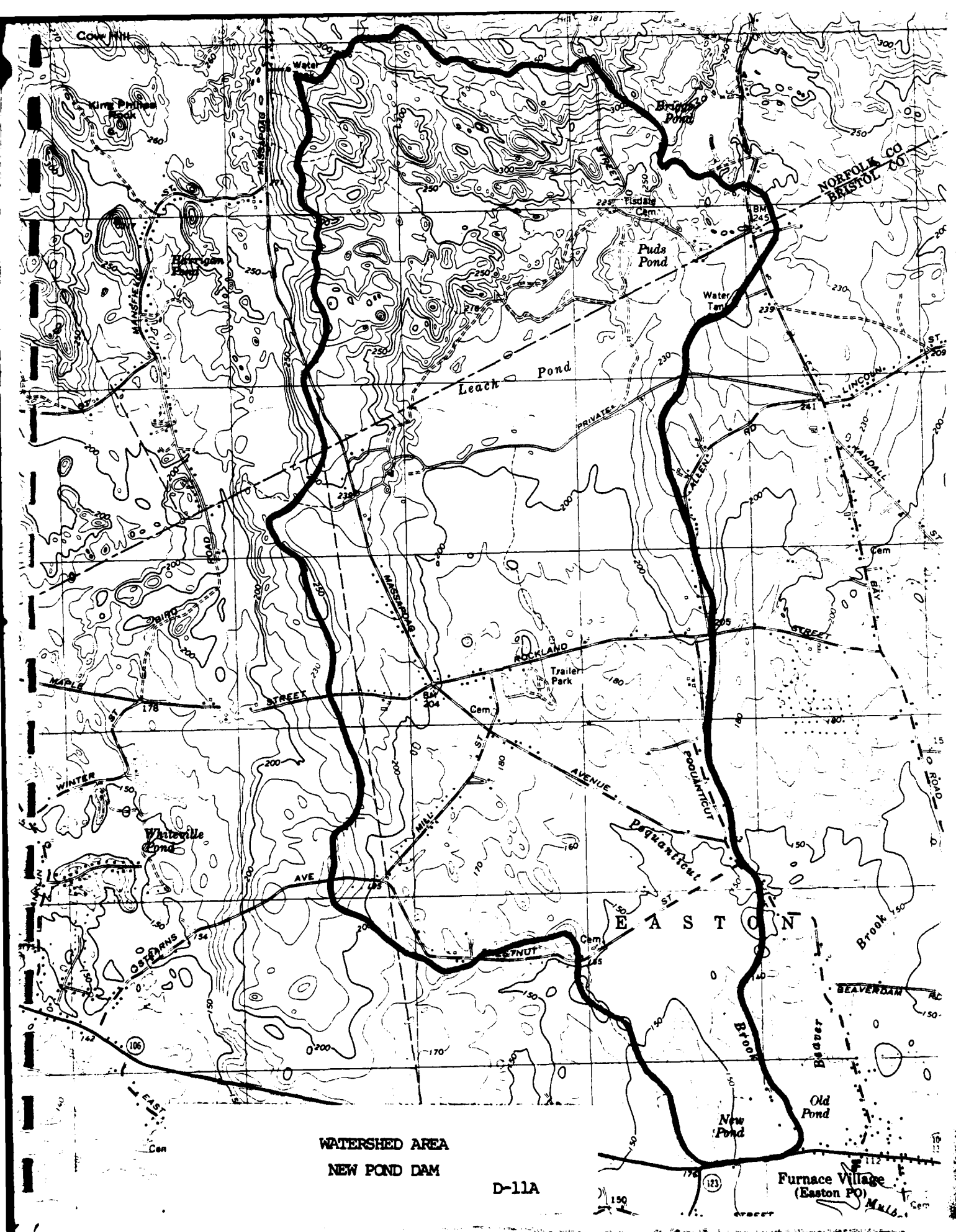


WATERSHED PLAN/CROSS-SECTION
LOCATIONS
NEW POND DAM
EASTON, MASSACHUSETTS

ASEC CORPORATION

MANSFIELD/BROCKTON QUADRANGLES

1" = 2083.3'


Cow Hill
King Philips Rock
Water Tank
Bridges Pond
NORFOLK CO
BRISTOL CO
Fiskdale Cem
BM 245
Puds Pond
Water Tank
Leach Pond
PRIVATE
LINCOLN
ST
RD
KANDALL
ALLEN
Cem
BAY
STREET
ROCKLAND
Trailer Park
MAPLE
STREET
Cem
WINTER
Whiteville Pond
AVE
MILL
ST
POQUANTICUT
AVENUE
Pequantitout
ROAD
EASTON
Brook
BEAVERDAM
RD
Badger
Brook
Old Pond
New Pond
Furnace Village
(Easton PO)
Cem
OSBORNS
Cem
EAST
Cem
WATERSHED AREA
NEW POND DAM
D-11A

Test Flood Analysis

Size Classification: SMALL (storage between 50 and 1000 acre-feet; height < 40')

Hazard Classification: SIGNIFICANT (based on significant ecomonic loss of 11 structures, overtopping of two roads, and some danger of loss of life).

According to COE "Recommended Guidelines" the hazard and size classifications of the dam indicate a test flood between the 100 year and ½ PMF.

Since the hazard classification is in the middle of the range for "significant", we will use ¼ PMF.

The ¼ PMF is estimated using the COE "Preliminary Guidance for Estimating Maximum Probable Discharges inPhase I Dam Safety Investigations" dated March 1978. Since the study area is in the eastern Massachusetts region, the flat curve of the Maximum Probable Flood Peak Flow Rate graph is used.

A Drainage Area of 4.8 square miles on the flat and coastal curve results in a PMF peak discharge of 800 CFS per square mile Therefore:

PMF = 4.8 sq. mi. x 800 CFS/sq. mi. = 3840 CFS

¼ PMF = .25 x 3840 CFS = 960 CFS

¼ PMF inflow = 960 CFS

Stage Storage

The storage at normal pool elevation 134.3 ft. NGVD is approximately 65 acre-feet. The surface area of the pond was measured from a Massachusetts Department of Public Works topographic map dated May 1967 (1"= 200' w/5' contours) at the pond level. The surface area was also measured at the 140' NGVD contour. Surface areas were then interpolated at various elevations. The storage was computed as follows:

Surcharge Storage:

At elevation 134.3, Pond Area = 18.0 acres

At elevation 136.0, Pond Area = 18.9 Acres

$$\frac{18.0 + 18.9}{2} \times h = 18.5 \times 1.7 = 31 \text{ acre feet}$$

At elevation 138.4, Pond area = 21.4 acres

$$\frac{18.9 + 21.4}{2} \times h = 20.1 \times 2.4 = 48 \text{ acre-feet}$$

Total Storage::

At elevation 138.4 ft NGVD

65 acre-feet + 31 acre-feet = 48 acre feet = 144 acre-feet

The elevation-storage curve is given on Graph 2.

For the drainage area of 4.8 square miles or 3073 acres:

$$1\text{" of runoff} = \frac{3073\ (1")}{12"/\text{foot}} = 256 \text{ acre-feet}$$

1 acre-foot = 1/256 = 0.0039 inches of runoff

Surcharge storage to the dam crest

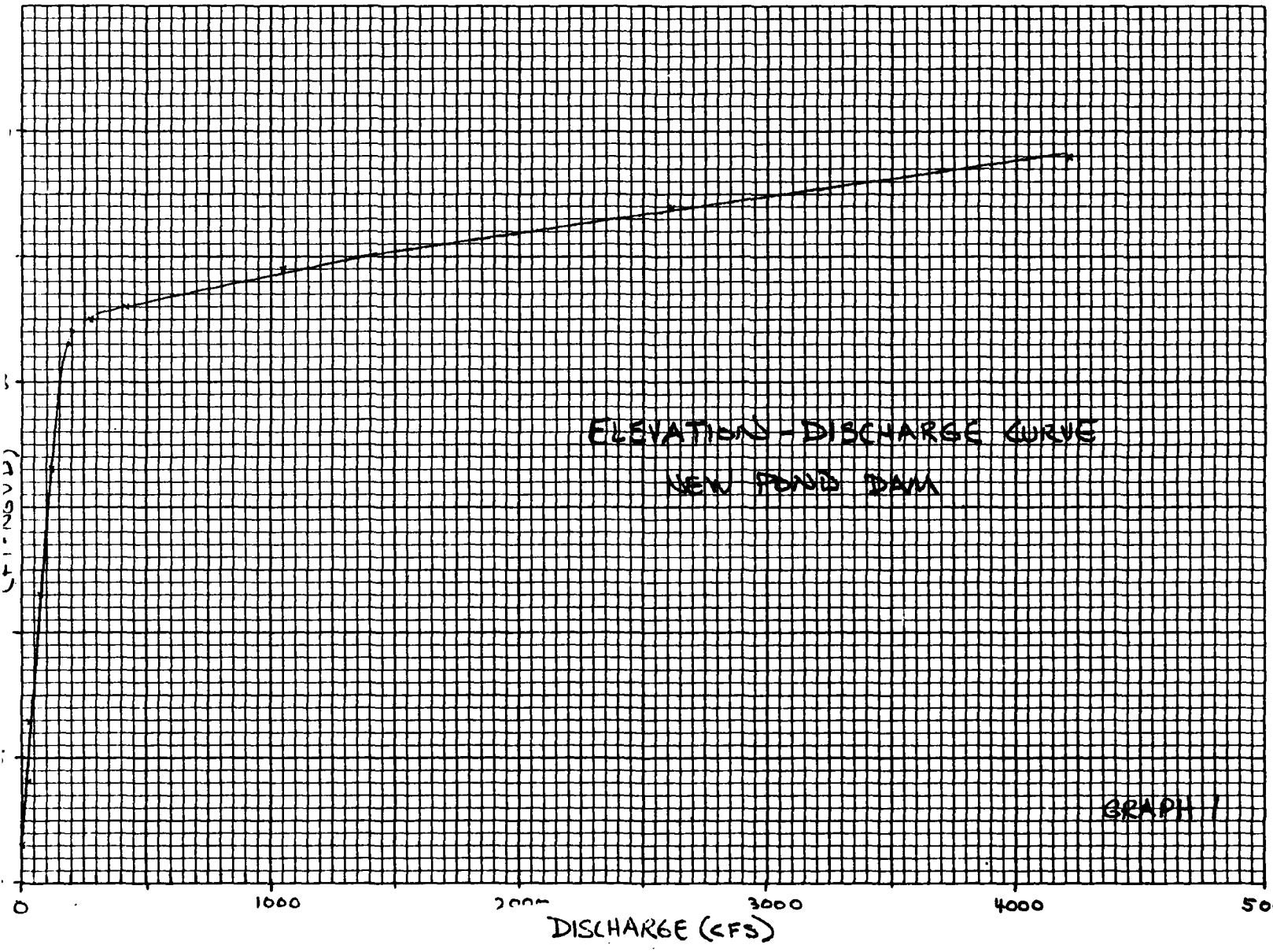
79 acre-feet = 0.31 inches of runoff

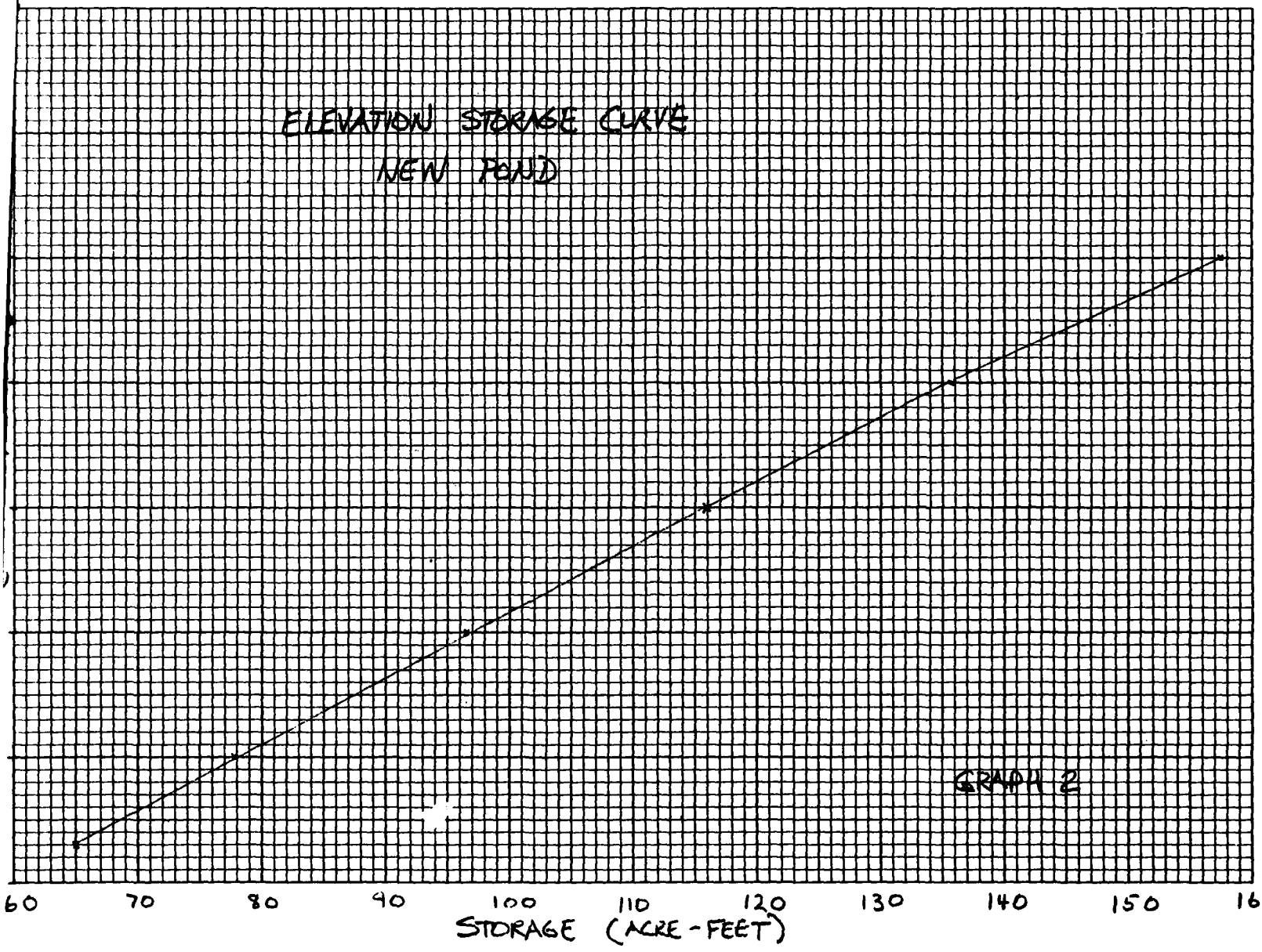
The attenuation of the test flood inflow due to surcharge storage in the pond is calculated on Graph #3.

The ½ PMF outflow is 890 CFS, with a corresponding elevation of 138.8' NGVD, which is 0.4' over the dam embankment at elevation 138.4' NGVD. Thus, the outlet can not handle the test flood without overtopping.

10 X 10 PER INCH

MADE IN U.S.A.




ELEVATION STORAGE CURVE
NEW POND
GRAPH 2
60
70
80
90
100
110
120
130
140
150
STORAGE (ACRE-FEET)

10 X 10 PER INCH

ELEVATION - DISCHARGE CURVE & TEST FLOOD ATTENUATION

NEW POND DAM

PMF R/O = 19"
& PMF = 4.75"

Q = 890 cfs at El. 138.0

Qp2 vs Elevation

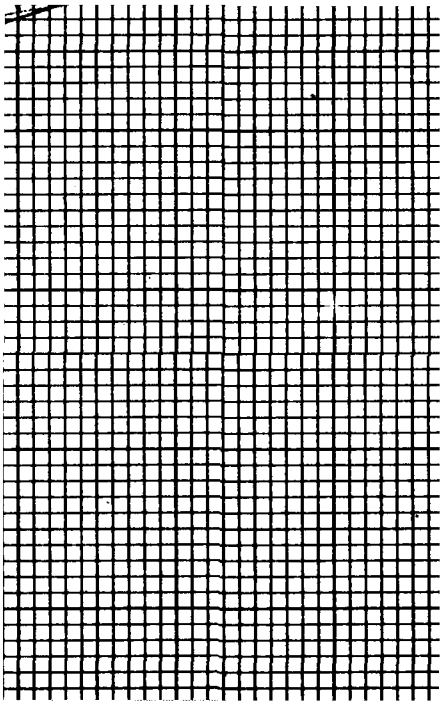
$$Q_{p2} = Q_{p1}\left(1 - \frac{Stor}{4.75"}\right) = 900\left(1 - \frac{Stor}{4.75"}\right)$$

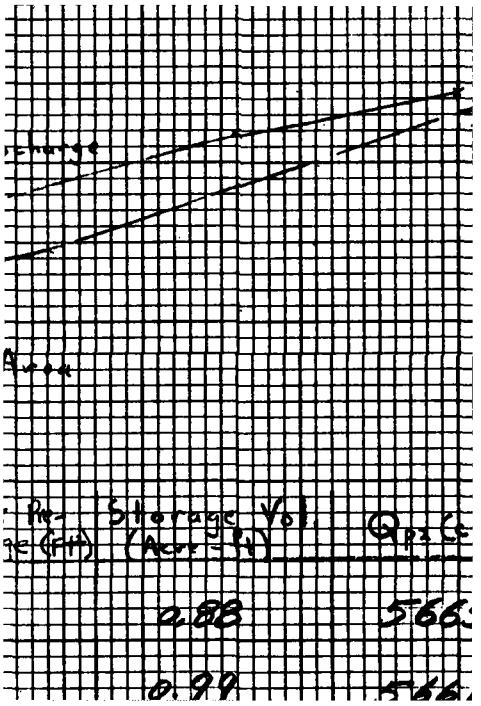
Elevation (Ft NGVD)	Surcharge Storage (Acre-feet)	Stor (Sur. Stor.* .0039 inch/ft.-mi²)	Q_{p2} (cfs)
138	70.1	0.27	905
138.5	81.2	0.32	895
139	92.5	0.36	887

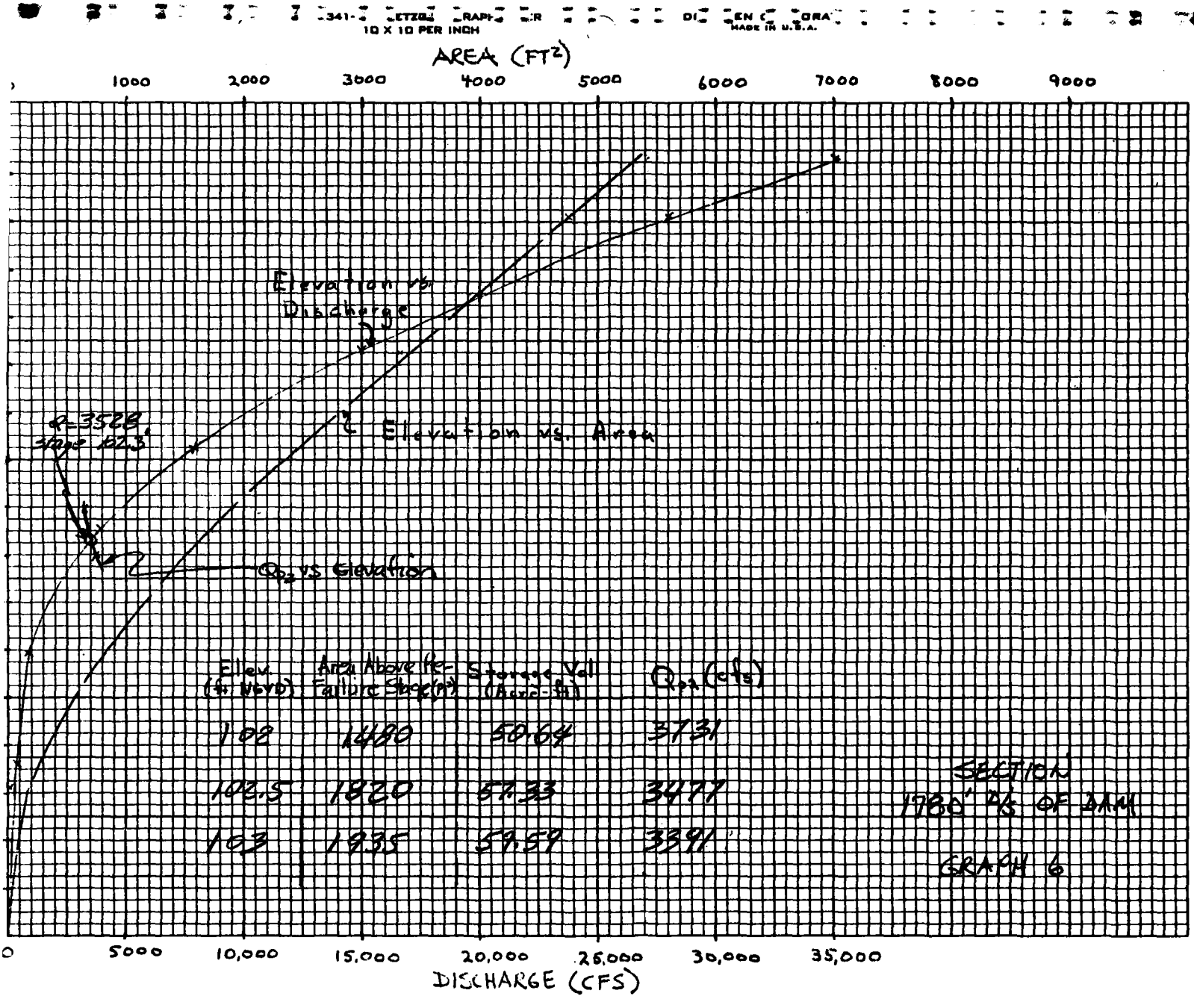
GRAPH 3

1000 2000 3000 4000 5000

DISCHARGE (CFS)



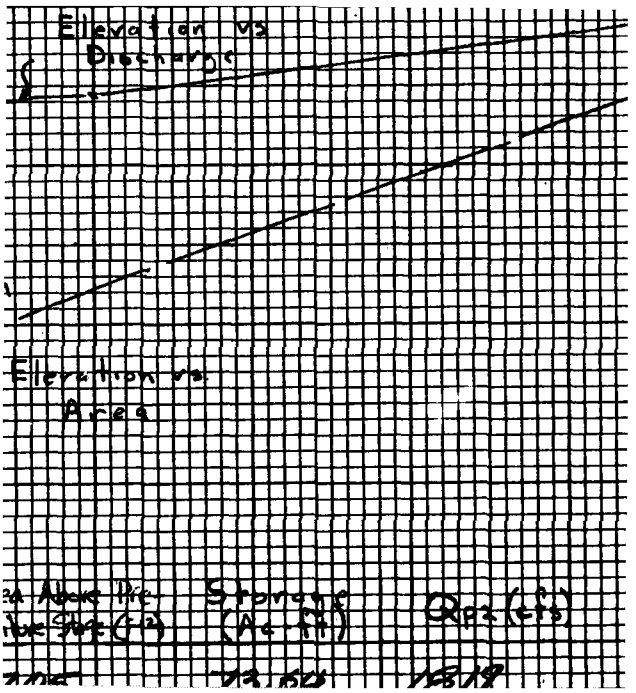

Storage Vol.
(Acre-ft)
0.88
566
0.99

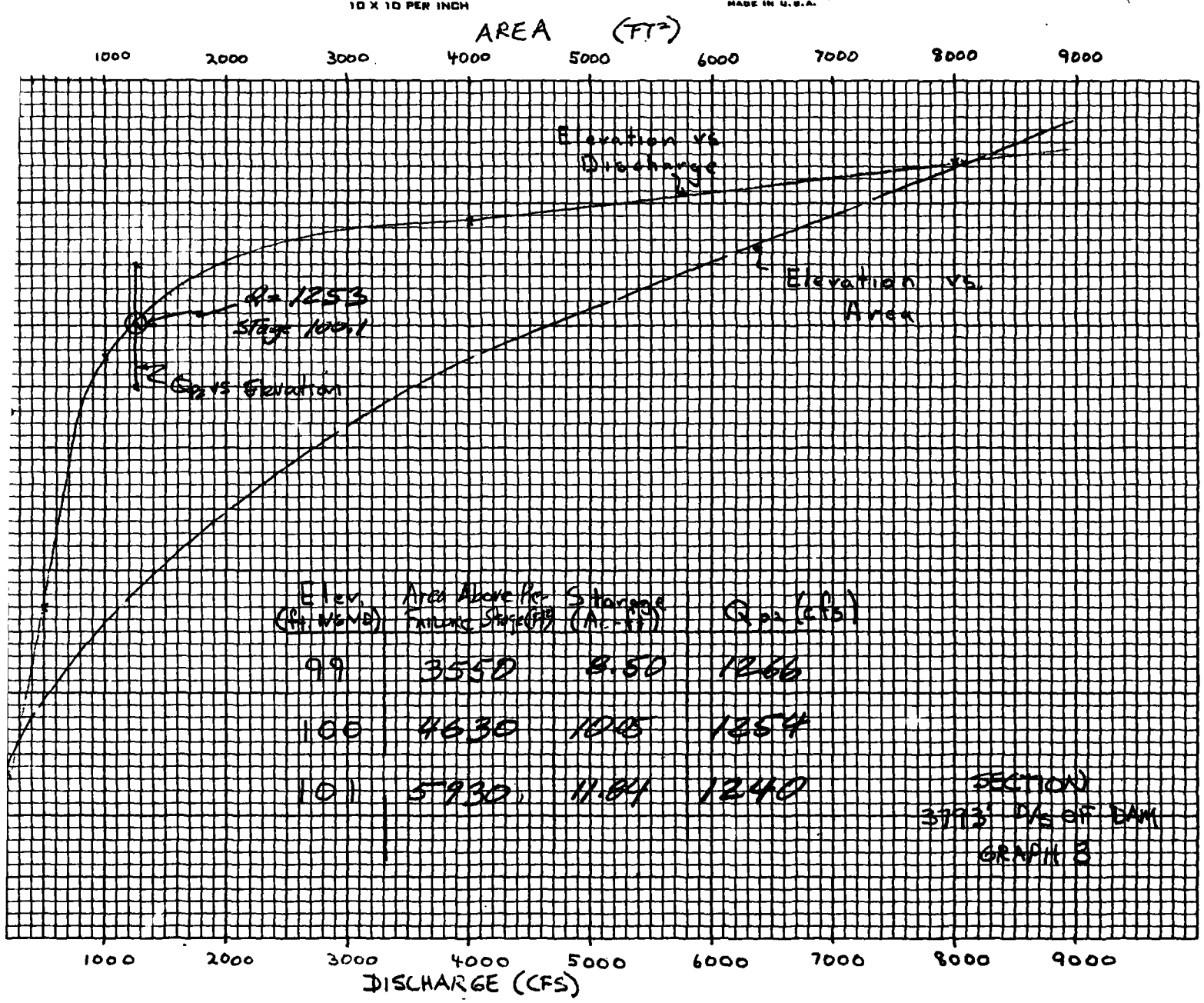


Elev. (ft NGVD)	Area Above Pre-Failure Stage (ft²)	Storage Vol (Acre-ft)	Q_{p2} (cfs)
102	1480	50.64	3731
102.5	1820	57.33	3477
103	1935	59.59	3391

SECTION 1760' N/S OF DAM

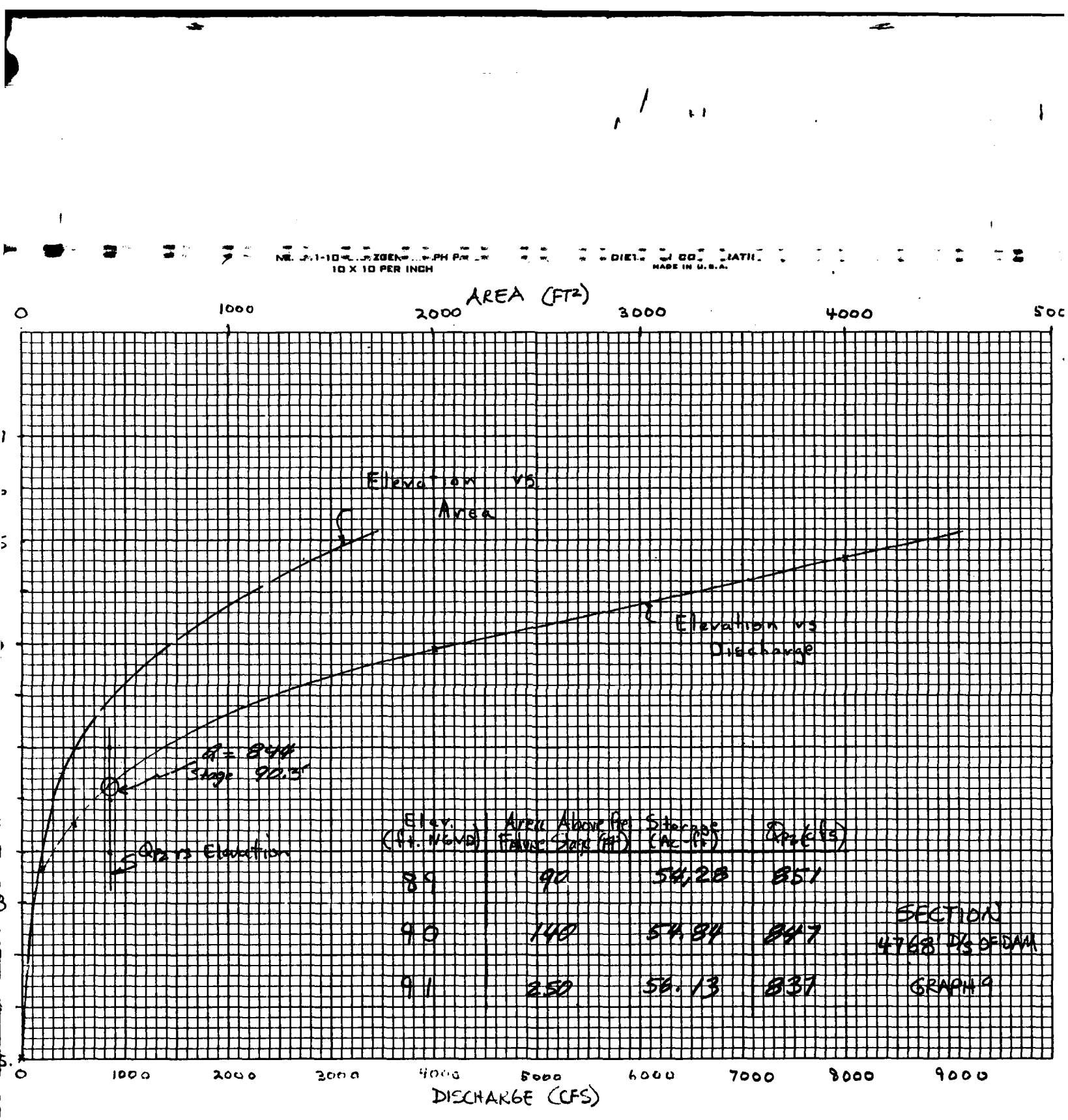
GRAPH 6


Elevation vs
Discharge
Elevation vs.
Area
Storage
(Ac-ft)
Qpz (cfs)



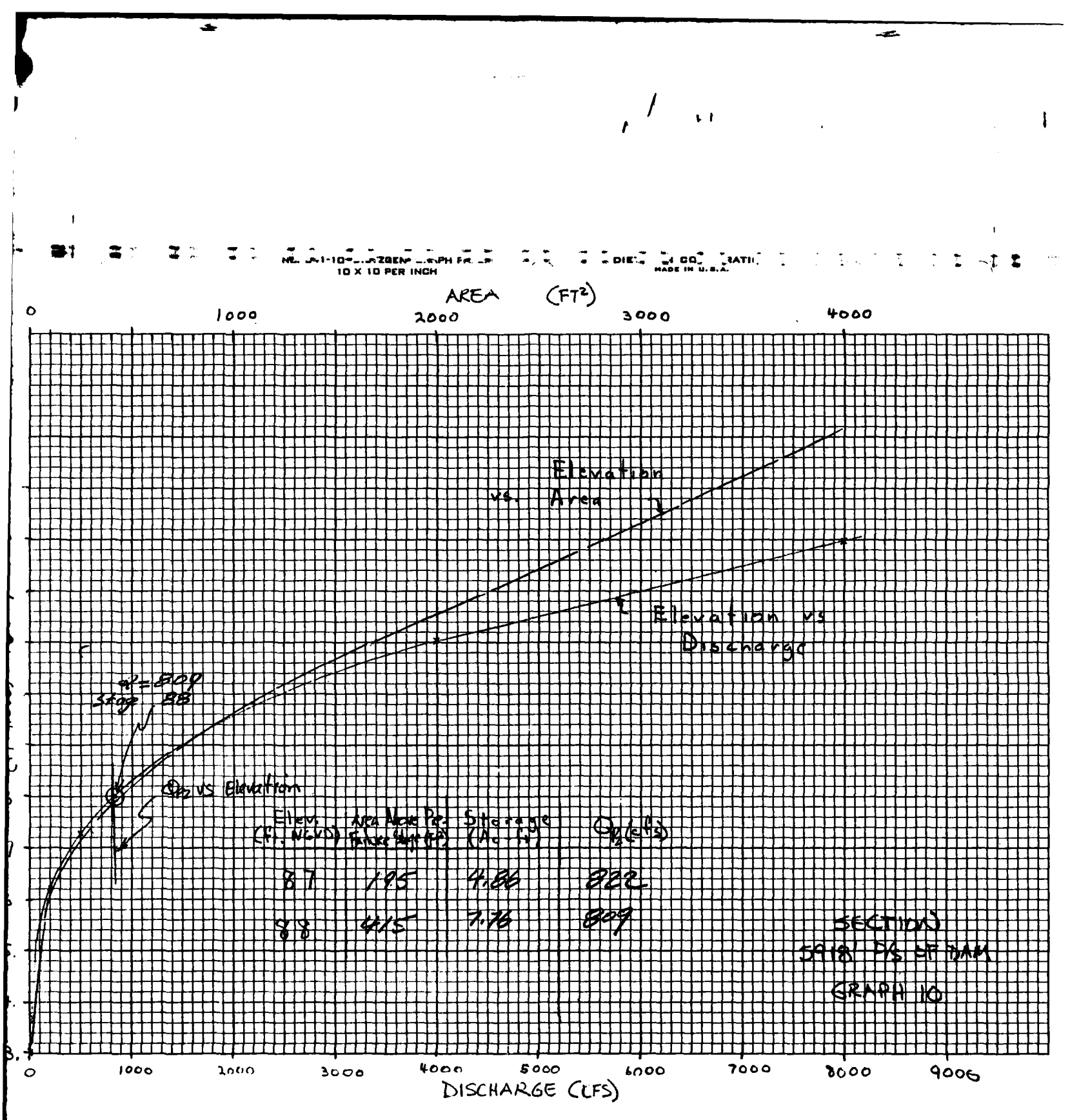
Elev. (ft above MSL)	Area Above Pre-Existing Stage (ft²)	Storage (Ac-ft)	Q_{PH} (cfs)
99	3550	8.50	1266
100	4630	10.95	1254
101	5930	11.84	1240

SECTION)
3993' D/S off DAM
GRAPH 8



Elev. (ft. NGVD)	Area Above the Flume Sill (ft²)	Storage (Ac.-ft.)	Q (cfs)
89	90	54.28	851
90	140	54.84	847
91	250	56.13	837

SECTION 4768 D/S OF DAM
GRAPH 9



Elev. (Ft. NGVD)	Area Acre Ft.	Storage (Ac. Ft.)	Q_{Elev} (cfs)
87	195	4.66	822
88	415	7.76	809

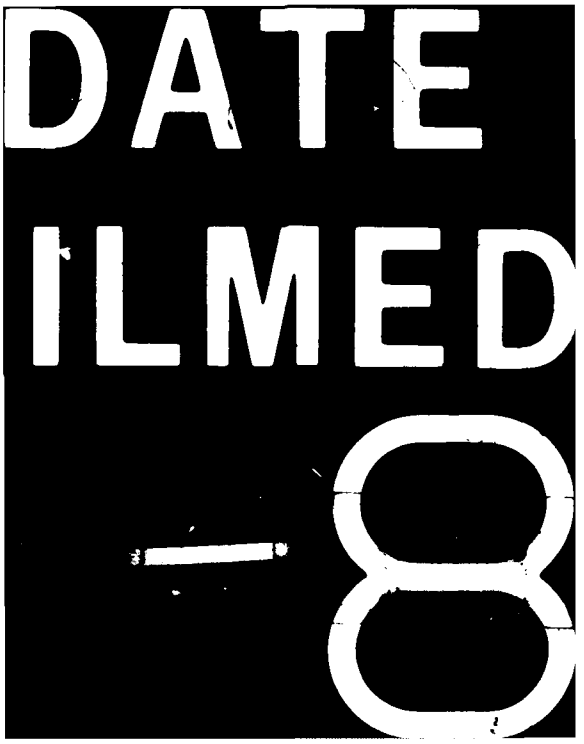
SECTION 5918' D/S OF DAM
GRAPH 10

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME


DATE
ILMED
8